Establishing a Transit-Oriented Development (TOD) Policy for Urban Sustainability in Ho Chi Minh City, Vietnam: A Theoretical Model

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Abstract: Ho Chi Minh City is the largest city and the economic center of Vietnam. It has a land area of 2,095 square kilometers with a population of 8.2 million. Its increasing population growth, rural-to-urban migration, high density development in the center, huge and increasing travel demand, insufficient road infrastructure and limited public transit, present an enormous challenge for its urban planners to develop an efficient and sustainable transportation system. A city built at sea level, its faces serious climate change issues as flooding and increased carbon use add to its environmental problems. This paper provides a theoretical model for the development of a Transit-Oriented Development (TOD) Policy for urban sustainability in Ho Chi Minh City. This model acts as a sustainable transportation planning strategy designed to produce vibrant neighborhoods with compact, walkable, mixed-use development centered on rail and bus transit systems. The paper addresses three basic questions. First, what is Transit-Oriented Development and how is it a model for urban sustainability? For this question, a recent research literature on TOD's is undertaken within the framework of its relevance for establishing a TOD Policy for Ho Chi Minh City. Second, how does a TOD Policy offer a solution to urban traffic problems in Ho Chi Minh City? For this question, an in-depth review of transportation problems in Ho Chi Minh City is undertaken with an analysis of how TOD's can provide a solution. And third, how can a TOD policy be implemented in Ho Chi Minh City? For this question, a pathway to how a TOD Model can be implemented for Ho Chi Minh is presented. This model discusses the present urban planning system; the tools that exist for a TOD policy to be implemented; and the barriers to that implementation. This research project was the result of a Fulbright Specialist Program Grant provided by the United States Government.

Keywords: Development, Planning, Transportation, Urban, Vietnam

Introduction

Ho Chi Minh City is the largest city and the economic center of Vietnam. It has a land area of 2,095 square kilometers with a population of 8.2-8.4 million (Fig. 1,2). Its increasing population growth, rural-to-urban migration, high density development in the center, huge and increasing travel demand, insufficient road infrastructure and limited public transit, present an enormous challenge for its urban planners to develop an efficient and sustainable transportation system. A city built at sea level, its faces serious climate change issues as flooding and increased carbon use add to its environmental problems (Phuc 2016, Paddi 2012, Richardson 2015, UG2019). This paper provides a theoretical model for the development of a Transit-Oriented Development (TOD's) Policy for urban sustainability in Ho Chi Minh City. This model acts as a sustainable transportation planning strategy designed to produce vibrant neighborhoods with compact, walkable, mixed-use development centered on rail and bus transit systems. The paper addresses three basic questions. First, what is Transit-Oriented Development and how is it a model for urban sustainability? For this question, a recent research literature on TOD's is undertaken within the framework of its relevance for establishing a TOD Policy for Ho Chi Minh City. Second, how does a TOD Policy offer a solution to transportation issues in Ho Chi Minh City? For this question, an in-depth review of transportation problems in Ho Chi Minh City is undertaken with an analysis of how TOD's can provide a solution. And third, how can a TOD policy be implemented in Ho Chi Minh City? For this question, a pathway to how a TOD Model can be

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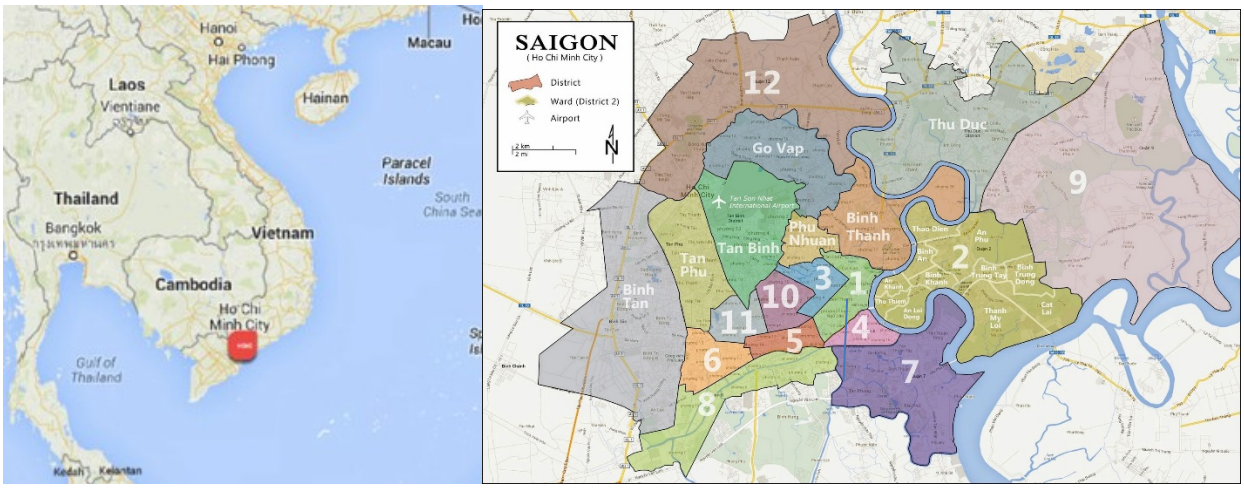


Fig. 1 Map of HCMCFig. 2. Districts of HCMC Source: Google Maps

What is Transit-Oriented Development (TOD) and how is it a Model for Urban Sustainability in Ho Chi Minh City, Vietnam?

Sustainable Transportation Planning

Transit-oriented development (TOD) is an important strategy for sustainable transportation planning. (Mooney 2018, Suzuki 2013, Wheeler 2013)). Sustainability transportation planning reverses the traditional hierarchy of transportation priorities and places the greatest emphasis on walking, bicycling, and the use of public transit to reduce vehicle mile travelled (VMT). It seeks an urban design which is pedestrian friendly with smaller block sizes; the use of sidewalks and planter strips; streets which are connected; pedestrian and bicycle paths; and compact and mixed-use building environments (Wheeler 2013). A sustainability-oriented approach reduces the emphasize on automobiles and facilitating traffic flow by utilizing techniques such as traffic calming and transport demand management programs to reduce demand. The four elements of sustainable transportation planning are: to encourage modes of travel that provide an alternative to the automobile and emphasize public transport; to utilize land use and urban design to reduce vehicle miles travelled; to use pricing as a tool to encourage alternative modes of transportation to the automobile; and altering travel behavior to coincide with the goals of sustainable transportation.

Transit-Oriented Development (TOD) and Urban Land Use

TOD's fit firmly in the land use element of sustainable transportation planning (Wey 2015, Sahu 2018, Nasri 2014,NJDOT 2019). They are part of a larger urban planning and management approach that emphasizes smart growth. Smart growth is a sustainable development movement that advocates compact walkable urban centers to avoid sprawl. It became popular in the 1980's as a strategy to combat the spread of U.S. metropolitan areas as a result of growth of automobile use and massive post-war highway construction. It called for a "New Urbanism" which was a return to the way cities were built prior to the automobile age where neighborhoods were located on rail or trolley routes in a linear nodal fashion (Wheeler 2013, Suzuki 2013). The design elements of smart growth consist of a circulation system of smaller grid-like streets; mixed use land use connected to public transit; and infill development that facilitated compact building and pedestrian-friendly neighborhoods. In the 1990's Peter Calthrope introduced the concept of Transit Oriented Development (TOD), defining it as "moderate and high-dense housing, along with complementary public uses, jobs, retail and services, concentrated in mixed-use developments at strategic points along the regional transit systems (Wheeler 1993)." TOD's linked land use to transportation to produce a more efficient, socially equitable and environmentally sustainable development model. Calthope proposed two types of TOD's: an Urban TOD which depended on MRT (rail) or BRT (bus) public transit with a higher percentage of commercial/office land use; and Neighborhood TOD's with commercial/retail/residential mixed use which featured local services and more open space. This distinction is important as the two types of design respond to different

planning challenges. The radius of an Urban TOD around a transit station is one-half mile or 800 meters. This constitutes a 10 minute walk or 2000 pedestrian steps to a transit station. A Neighborhood TOD has a radius around the transit station of one-fourth mile or 400 meters and a 5 minute walk. Generally, TOD's are divided into three distinct areas: an entrance or gateway zone; an activity or middle zone and an outer transition zone (Fig. 3). The entrance zone is characterized by transit or mobility activity; the midway zone has the highest density with residential and retail activity; and the outer transition zone has decreased density of activity and a wider range of housing types. In the United States, TOD's are often referred to as "Transit Villages" and are part of redevelopment plans for the revitalization of downtown regions (NJDOT-2019). Many TOD projects provide a nodal or poly-centric model for regional development. In many Asian cities, where density is high, an emphasis on TOD development is paramount, although environmental carrying capacities can be a serious concern. The amount of noise, pollution and congestion around a MRT station can become a serious environmental issue(Sahu 2018, Wey 2015, Wu 2016, Xiaolei 2018, Xu 2017, Loo, 2010).

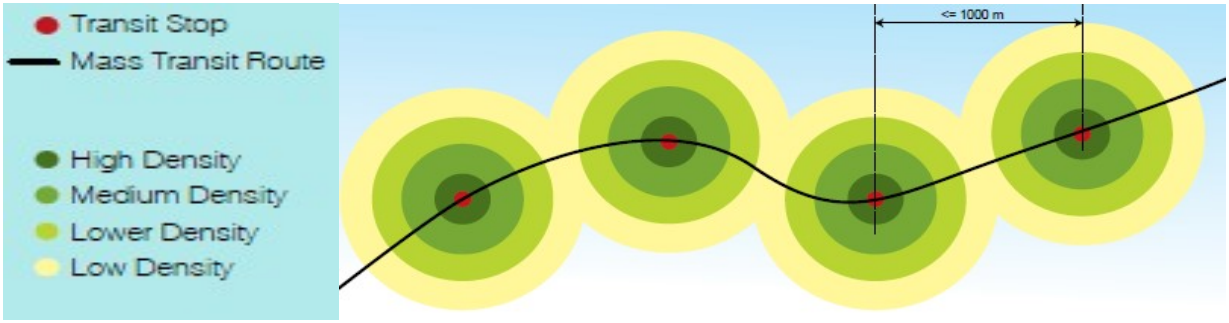


Fig. 3 MRT Stations and Concentric Zone Land Use Model Source: Adapted from Hoang, 2011

Evaluating TOD's for Urban and Regional Planning

There are four models for measuring the potential impacts of TOD's on cities and urban regions. The first is a criteria model which is best illustrated by Cervero and Kockelman (Cervero 1997). This model originally emphasized threecriteria for determining the effectiveness of TOD plans. First, density which includes metrics on population, employment, and accessibility; second, diversity which stresses mixed land use, housing types and residential-retail interface; and third design, which encompasses streets, pedestrian and cycling paths, and sites. Later, two more criteria were added, namely destination accessibility which measures transit stop connectivity; and a distance to station metric measured in minutes. These five criteria offer an effective way to measure and evaluate the efficiency of a TOD plan for cities.

A second model is based on the principles of sustainable transportation and proposed by Wey in his study of Taipei City (Wey 2015). Wey advocates three criteria for evaluation based upon sustainability goals: economic efficiency; environmental sustainability; and social equity. Each goal has its own indicators. For economic efficiency, a useful metric ispopulation density for the subject region, the spatial density of commercial and retail facilities, and the design of pedestrian spaces. For environmental sustainability, the environmental carrying capacity for high density development, the externalities resulting from mixed land use, and the availability of open space are all key variables. And lastly, social equity which can be measured though housing affordability, housing mix, and the equality of accessibility and safety for all people. These sustainability metrics broaden traditional metrics to encourage the effects of TOD development relative to gentrification and the social impact of TOD's on less affluent populations.

A third model is designed for the urban region. This regional model is best exemplified by the regional development plan for TOD stations in Bandung Metropolitan Area, Indonesia (Widyahari and Indradaji 2015). This model is based on local conditions and is designed to integrate TOD's into existing transportation and spatial plans. Widyahari and Indrajaji establish four types of TOD's: a regional center TOD; and urban center TOD, a sub-urban center TOD and a transit-town TOD. Each TOD is characterized by different mixed use land requirements, housing types, building densities and retail. While they do not discuss the development of TOD's on a neighborhood scale, this model provides a template for TOD development on a regional level under varying conditions.

And finally, a fourth model is the node-place model first advocated by Bertolini and expanded on by Vale (Vale 2015). This model provides two urban design features needed for effective evaluation of TOD plans. Nodes refer to transportation networks and how they are linked to the connectivity of mass transit systems. Interchange

stations, for instance,tend to have a greater ridership than single line stations, increasing the capacity of the TOD to attract more riders. This means that those stations are best suited to connect local traffic to regional traffic. Places refer to specific urban design characteristics related to the individual station, such as walkability, intensity and diversity of land uses, and its attractiveness as a local destination. Vale elaborated on the ideas of Bertolini to establish an evaluation matrix where stations could be evaluated on a matrix ofhigh nodal, high place, low nodal, low place. Stations which exhibited high nodal and high place would attract the most riders, while stations that had low nodal and low place would attract the least. This matrix could be used to evaluate the needs of a TOD station. For instance, a station which had a high nodal but low place score could increase their place design elements to increase ridership (Table 1).

Table 1. Evaluating TOD Design Models

Name	Metrics
Criteria Model	Density, Diversity, Design, Destination, Distance
Sustainability Model	Economic Efficiency, Environmental Sustainability, Social Equity
Regional Model	Local Conditions, Historic Development Patterns, Transportation
Node-Place Model	Connectivity, Transportation Networks, station design, walkability

Source: Robert W. Taylor, 2019

How does a TOD planning policy reduce urban transportation issues in Ho Chi Minh City?

Ho Chi Minh City (HCMC)

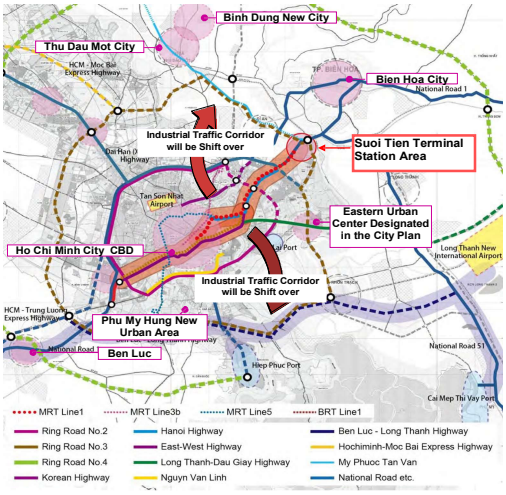
Ho Chi Minh City is the largest city and economic center in Vietnam. It consists of a land area of over two thousand square kilometers with a population of 8.2-8.4 million people. HCMC has always attracted the greatest share of foreign direct investment to Vietnam than other urban centers. While having only 11% of the country's population, it controls 23% of its national GNP. One of the main influences on transportation in HCMC has been the large rural to urban migration that has stimulated its growth, with an estimated annual increase of 130,000 migrants.From a population of 3.9 million people in 1989 it hasdoubled today with 13 million in the metropolitan region which includes adjacent provinces. HCMC is a "motorcycle dependent city" where 2-wheeler private transportation accounts for 86% of modal share while public transport is only 5% (Richardson, 2015). Motorcycle usage has increased from 6.8 million riders in 2015 to 7.6 million in 2019, with passenger cars increasing from 556 thousand in 2015 to an estimated 700 thousand in 2019. Both these increases have exacerbated traffic congestion and air pollution (Vu, 2017).

There are a number of planning strategies that the government can undertake to reduce some of the complex issues that have increased vehicular congestion in HCMC. A first is to restrict vehicle use through congestion pricing, taxation, and restriction of vehicle use (Mooney, 2018, Wheeler, 2013). These strategies are already under consideration in both Ho Chi Minh City and Hanoi. A second strategy which this paper advocates is the use of TOD's to encourage higher density development along major public transit lines. This strategy emphasizes the use of Bus Rapid Transit (BRT) and Metropolitan Rail Transit (MRT) to concentrate development along transit nodes following the principles of TOD development, which emphasizes compactness, land use mix, walking and cycling paths, and a shift to public transit use as an alternative to private vehicle use. Ho Chi Minh City has developed plans for both BRT and MRT's (JICA, 2016, Suzuki, 2013).

Bus Rapid Transit (BRT) Plans for Ho Chi Minh City

BRT's for Ho Chi Minh City were first proposed by a World Bank Study in 2012 through a proposed greenway corridor from west to east (Fig. 4). This proposal sought redevelopment of a local canal system that would integrate a high-density BRT transit corridor around a lower-density "island valley." This study was designed along the principles of the World Bank's Ecological Cities as Economic Cities (Eco2) concept which correlated land use design and spatial urban development as key features of a transition to urban sustainability (Suzuki, 2013). A second major study that integrated land use planning around transit was the "Preparatory Survey on Transit-Oriented Development in Binh Duong Provide and BRT Development Project" conducted by the Japan International Cooperation Agency (JICA) in 2012 (JICA, 2016). The JICA study sought to address the expansion of Ho Chi Minh City into surrounding Binh Duong Provinceby designing a BRT that would connect to line 1 of the MRT at Suoi Tien station. Using the government's Socio-economic Development Strategy 2010-2020 as a guide, it would link physical infrastructure with new construction (Fig. 5). The design was built on HCMC's plan to emphasize poly-centric regional development as it expects Binh Duong Province to double in population by 2025 with the resulting

passenger demand (JICA, 2016)At present, no TOD's have been built in HCMC. While the BRT Plan from Suoi Tien to Binh Duong New City is on hold, the development of the MRT Line 1 has moved ahead with a completion date scheduledfor 2021.



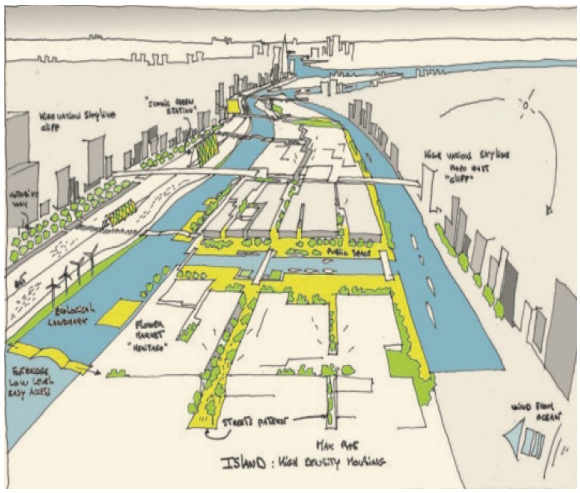


Fig. 4 JICA BRT Plan Source: JICA, 2016**Fig. 5: Island Valley Design**Source: World Bank, 2012

Metropolitan Rail Transit (MRT) for Ho Chi Minh City

First proposed in 2012, the MRT Master Plan called for 6 lines, with Line 1 nearing completion (Figure). It consists of 14 stations, three of which are underground and eleven above-ground, with a network length of 19.7 km, with 2.6 km. underground (CBRE, 2015) (Fig. 6,7). A study was undertaken in a planning workshop at Ho Chi Minh City University of Transit under the Fulbright Specialist Program to envision how three stations along Line 1 could be designed into TOD's. The three study sites were: Ba Son Station; Thao Dien Station; and Rach Chiec Station. Ba Son Station is the third station from the center and one of the three stations built underground and within the Central Business District. The second station, Thao Dien, is the sixth station from the center located in rapidly developing District 2, across the Saigon River. And the third station, Rach Chiec, is the eighth station from the center, located in an area that is planned as a center for sports activity. Each of the three selected study areas has different characteristics, and as a result, different TOD design issues. The Ba Son Station site is in the inner central business district 1 zone characterized by heavy residential and commercial density, with greater ridership opportunities and greater capacity to integrate pedestrian design features into the TOD. Its greatest challenge is that redevelopment will increase property values and restrict residential use to only high-income people. The second site, Thao Dien, is across the Saigon River in the urban/suburban zonecharacterized by high density but low rise residential with less commercial development. This is part of District 2 which is in a low-lying area and is subject to flooding. The challenges are increased property values leading to neighborhood disruption and gentrification as well as the risk of flooding. The last study area isin the urban/suburban fringe of Rach Chiec, and is the last station before the outer suburban zone. This station is surrounded by more developable land and possesses more design opportunities for new development. The design challenges of this station will be whether open space will be preserved in the TOD design and how to integrate it into the open space across Hanoi Highway. All three stations have different characteristics and different challenges. The first two stations will need designs that emphasize redevelopment, while the third station can create a TOD design that emphasizes vertical high density residential around open green space (Fig. 8,9,10).

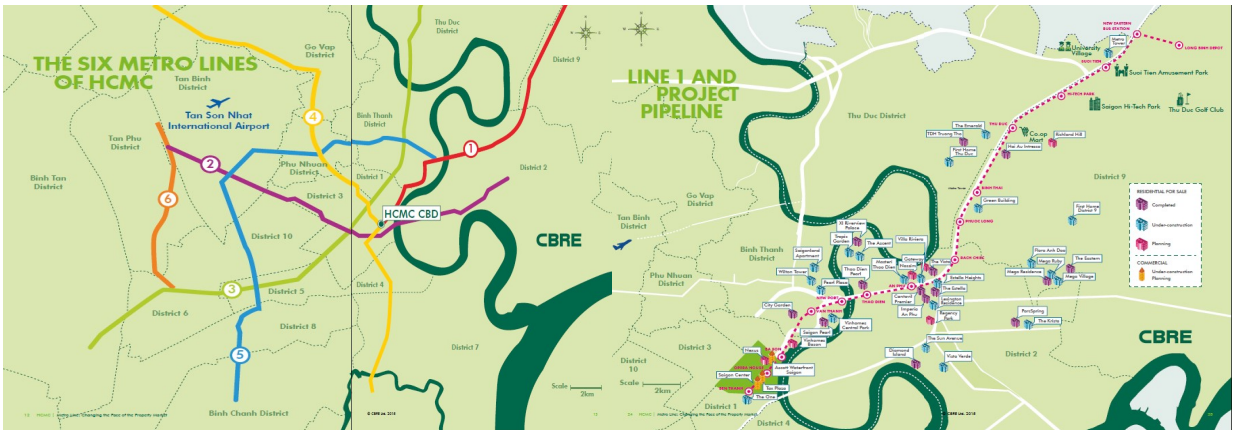


Fig. 6 Six MRT Lines(Source: CBRE, 2015)**Fig. 7 Line 1 Development Projections**

Fig. 8 Ba Son Station TOD Conditions: Cenral Business District (Dense Urban) Source: TOD Workshop 2019

Fig. 9 Thao Dien Station TOD Conditions (Urban/Suburban) Source: TOD Workshop 2019

Fig. 10 Rach Rhiec Station TOD Conditions: Urban/Outer Suburban Source: TOD Workshop 2019

How Can TOD's be implemented in Ho Chi Minh City?

Development of Land Use Laws

In order to develop a theoretical model for TOD development, it is necessary to review the land law and master plans for Ho Chi Minh City (Law, 2011, Huynh, 2015, PADDI, 2012, Nguyen, 2016). A series of land laws have greatly influenced the spatial development of Ho Chi Minh City. The National Land Law of 1988 opened up land use rights to organizational and individual land users. In 1991, the national government privatized home ownership by selling state house to current occupants. In 1993, a new law increased land rights to include the right to transfer, exchange, lease, inherit and mortgage sites. In 2003, a new law stimulated foreign direct investment in the urban real estate development by creating a more market-oriented system and paved the way for further opening in the Law of 2013. From 1998 to the present, a transition from a state-controlled system to a more open privatized system has had a significant impact on urban spatial development of HCMC.

Expanding land use rights has supported urban planning. The first city master plan was issued in 1993 and revised and adjusted in 1998, 2005, and 2011. According to Huynh, these plans were a "facilitation device for the city government to negotiate with the central government for greater fiscal and policy autonomy, to hunt for international donors' financial contributions in urban redevelopment, and to lure private businesses to participate in building the city." (Huynh, 2015). Many real estate developments did not follow the master plans because the city needed private developer finance to develop infrastructure. In many Asian cities, cities do not gain much revenue from property taxes but through the selling or leasing of land. This results in insufficient capital for infrastructure which encourages large developers to dictate terms of development. The difficulty of securing construction permits for small developers; a fragmented landownership system; and real estate speculation are all factors which hinder timely and efficient urban development.

TOD Theoretical Model for HCMC

A TOD Theoretical Model for HCMC is based on four elements (Table 2). First, the transit types planned for in a TOD Model are Bus Rapid Transit (BRT) and Metropolitan Rail Transit (MRT). BRT stations foster a development pattern that is linear and the distance between stations is smaller. MRT stations are farther apart and generally use a concentric zonal pattern of development, where the gateway emphasizes connectively to a high density commercial and residential center which gives way to a middle density zone and then a lower density residential area with a surrounding greenbelt some 500-800 meters from the station.

A second element is that TOD's need to be designed in line with a regional development spatial pattern that emphasizes a multi-nodal design, similar to the concept of a poly-centered metropolitan region suggested in the original HCMC Master Plan (Phuc, 2016, Hoang, 2018, Nguyen, 2016, Suzuki, 2013). This regional master plan emphasizes high rise buildings that surround MRT TOD stations that need to intersperse high density residential with "island gardens" (Fig. 13). This design pattern is similar to the World Bank's "Ecocities" model and discourages urban sprawl or extreme residential decentralization (World Bank, 2015). A TOD model built around

both MRT's and Bus Rapid Transit (BRT) decreases the need to rely on private vehicles for transport and encourages a more efficient land use pattern(Sahu, 2018, Renne, 2009, Xiaolei, 2018, Xu, 2017) MRT TODS use a concentric zone model for development while Bus Rapid Transit (BRT) TODS use a linear development pattern since stations are closer together and open space would also be linear in design.

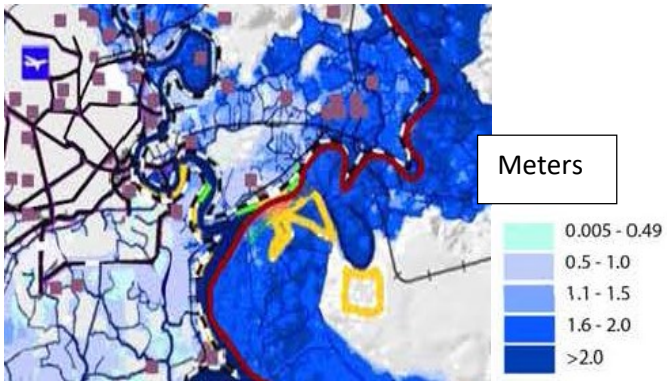
A thirdelement is that climate change will have a major impact on urban development and that TOD's need to be designed with those impacts in mind (Meerow, 2016, Thao, 2019). Since HCMC is in a coastal zone at low sea level, designs need to follow contours and hydraulic flow that produces the least vulnerability to the urban inhabitants (Fig. 11). While present patterns of urban development in HCMC have stressed development in low lying areas (District 2 and 9), nevertheless the development of sufficient open space around the TOD's need to be designed to relieve flooding in the planned TOD's on Line 1 in these districts.

A fourthelement is that a TOD urban development patterns in HCMC need to rely on large scale developer participation. Only large-scale developers, many who are foreign, have the financial capacity to be able to implement a TOD development model, and a TOD development model is absolutely necessary if HCMC is able to meet the development requirements of its population while maintaining open space and reducing flooding vulnerability. Developing TOD's around MRT stations requires large financial investment and infrastructure. Incentives need to be devised that allow developments to make a profit while submitting to the goals of a regional TOD plan. One of the barriers and key obstacles that the government must deal with is the development of inequality and housing affordability in this development model. In more built up areas of TOD development, the issue of a "gentrification" can occur where existing residents will be pushed out of the area due to increasing cost of living. It is the responsibility of the government to minimize this social conflict by developing policies that allow existing populations to be housed along these TOD redevelopment areas. Also, in low dense new development areas that have more undeveloped open space, the government needs to develop policies whereby developers will include housing for all income groups. This can be done through either government supports or through mixed housing designs.

Elements:	• TOD Stations are related to either BRT or MRT Transit Types • A Multi-Nodal Regional Master Plan Model • Climate Change needs to be a central consideration for TOD Design • TOD Development requires Large Developer Support
Transit Types:	• Metropolitan Rail Transit • Bus Rapid Transit
Design Criteria:	• Node-Place Balance • Compactness • Land Use Mix • Housing Design Mix • Pedestrian and Bicycle Paths • Space for Intermodal Connectivity • Gateway Interaction to Neighborhood • Public Policy
Challenges:	• Climate Change • Financial Capacity • Land Rights • Equity • Urban Planning

Table 2. Theoretical Model for TOD Development in Ho Chi Minh City

Source: Robert W. Taylor, 2019



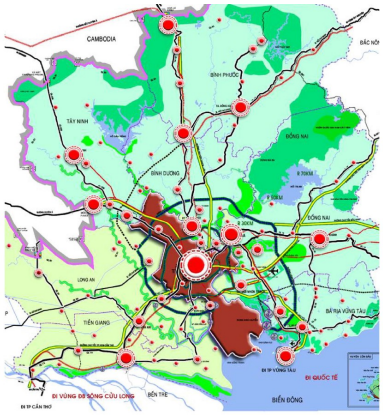


Fig. 11 Flooding Scenario HCMCFig. 12 HCMC Regional Master Plan
Source: Thao 2019, Source: Ministry of Construction 2009

Fig. 13 Metro Star Project in District 9 next to MRT Station 10 on Line 1
Source: Metro Star 2019

4.3 Criteria for TOD Success

A theoretical model needs criteria for success. First, there needs to be a balance between transit node and place. The TOD needs to have interconnectedness to the metropolitan region while the TOD itself must have a sense of place or cultural distinctiveness. This requires planning for convenient paths, both pedestrian and bicycle, that allow residents to have a sense of place and convenient access between station and home. Second, the TOD must possess a compactness that utilizes land most efficiently allows for high density populations while preserving open space on the periphery. Third, there must be sufficient mixed land use so that commercial, residential and retails uses are in close proximity. Fourth, a housing mix needs to exist from small apartments to larger villas that cater to the different income groups and housing tastes of the resident. Fifth, there must be pedestrian and bicycle paths that can accommodate local populations as they move from TOD station to their homes. These paths should be restricted to non-motorized vehicles. Sixth, there needs to be space for intermodal activity. This means that ample parking must be provided near TOD stations for motorbikes and special pathways should be provided exclusively for these vehicles. These parking spaces should be vertical if possible, in order to conserve space and maintain theft protection. These motorbikes should be electrified so that air quality around the station is at a high level. Seventh, a special plan for the integration of the TOD gateway to the surrounding neighborhood should be a required feature. The gateway consists of 100-200 meters around the TOD Station and is most critical as an integrating feature into the urban fabric of the surrounding neighborhood. And eighth, a set of policy statements geared to implementing the goals of a TOD Development Pattern need to be devised. These policy statements should include incentives for developers to implement TOD criteria such as open space requirements, affordable housing, and maintaining the cultural and natural integrity of the landscape.

Challenges to Model Implementation

There are four major challenges to the implementation of the TOD Model for Ho Chi Minh City. First, climate change is not only having an impact on flooding events but it is also raising the urban surface temperature. This has an impact on repairs for transportation equipment and the greater costs for development. Since HCMC is coastal, the urban development axis is largely in low-lying areas. This is going to require that urban planning correspond to local terrain, surface contours, and natural ecological systems. A second challenge is in the financial capacity of the city to finance infrastructure conducive to a TOD model. Since urban funding relies on land sales and not property taxes, this means that large developers will continue to dictate terms of urban development. A third challenge is that although land rights law has evolved significantly since the 1980's there are still major issues related to land ownership and compensation. A fourth challenge is the distribution of equity across the city region. Equity refers to the ability of all social groups to have fair and equal access to urban mobility, jobs, and housing. TOD development can produce a gentrification effect or push less affluent populations into undesirable transit deserts. And lastly, the challenge of effective urban planning. Since urban plans are often secondary to real estate developer ambitions, the capacity of the city to maintain control over urban development will be put to a test.

Conclusion

In conclusion, this paper proposed three questions. The first is what are TOD's and how can they produce a more efficient model of urban development for Ho Chi Minh City? This question was answered by reviewing the literature on TOD's and how they can reduce the use of private vehicles, emphasize public transit, and present a more efficient use of urban land. The second is how canTOD development respond urban development challenges ahead for HCMC? While HCMC relies currently on motorbikes as its primary form of transportation, an urban plan that emphasizes TOD development reduces their use and restricts them to smaller trips, mainly for leisure or neighborhood use. Traditional journey to work patterns and major entertainment trips to the city center (District 1) would be reduced. And lastly, what would a theoretical model for TOD development in HCMC look like? It would emphasize high density TOD stations surrounded by open space in a multi-nodal regional model that would emphasize pedestrian access, mixed land use and affordable housing options due to the multi-varied housing options available to the residents.

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