Review Article: Potential Works in BMR Transit-Oriented Development: Lesson Learned from The Past

การศึกษาแนวทางที่มีศักยภาพเพื่อการพัฒนาพื้นที่จุดเปลี่ยนถ่ายสัญจรในกรุงเทพมหานครและปริมณฑล: บทเรียนจากประสบการณ์ในอดีต

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Abstract

This article aims to provide insightful discussions on how to make TOD works in Bangkok Metropolitan Region (BMR) according to the lesson learned from the past through a systematic review and discourse analysis. The findings indicated various hindrances to accomplish 'the Avoid-Shift-Improve approach' in BMR brought by dilemmas on metro unreachability, unplanned-structure of bus rapid transit, unpopularity of Suvarnabhumi Airport Rail Link, non-integration of transportation and land use planning and silo practices. The study discoursed that unlike the foreign examples of TOD planning, mass rapid transits in BMR were initially built without any initiatives of TOD. The versions of TOD guidelines from other cities may not fit to the city; hence the study on multidimensional TOD practices must be performed to make TOD happen in BMR. Additionally, the potential works on creating TOD in the station areas involve collaboration among multiple stakeholders and land redevelopment associated with urban economics.

บทคัดย่อ

บทความนี้มีวัตถุประสงค์เพื่อทำการอภิปรายในประเด็นการหาแนวทางพัฒนาพื้นที่จุดเปลี่ยนถ่ายสัญจร (TOD) ในพื้นที่เขตกรุงเทพมหานครและปริมณฑลจากบทเรียนประสบการณ์ในอดีตด้วยวิธีการทบทวนวรรณกรรมอย่างเป็นระบบและการวิเคราะห์วาทกรรม ผลการศึกษาชี้ให้เห็นถึงอุปสรรคนานัปการที่ขวางกั้นความสำเร็จในการพัฒนาเมืองตาม "แนวคิดหลีกเลี่ยง เปลี่ยนวิธี และพัฒนา" ในพื้นที่ศึกษา อาทิ การเผชิญปัญหาในด้านการเข้าถึงรถไฟฟ้า โครงสร้างที่ไร้การวางแผนของโครงการรถโดยสารด่วนพิเศษ ความไม่เป็นที่นิยมอย่างแพร่หลายของรถไฟฟ้าเชื่อมท่าอากาศยานสุวรรณภูมิ การขาดการบูรณาการระหว่างการวางแผนการใช้ประโยชน์ที่ดินร่วมกับการขนส่ง ตลอดจนการบริหารจัดการแบบแยกส่วน (Silo) การศึกษาในลักษณะวาทกรรมแสดงให้เห็นว่า การพัฒนาระบบคมนาคมสาธารณะความเร็วสูงในพื้นที่ศึกษาแตกต่างจากเมืองอื่นๆ ที่ไม่ได้มีการวางแผน TOD ก่อนที่จะสร้างระบบ ดังนั้นรูปแบบแนวทางการพัฒนา TOD ในต่างประเทศอาจไม่สามารถถูกยกนำมาใช้ได้กับพื้นที่สถานีที่ศึกษาได้โดยตรง ทั้งนี้มีความสำคัญเป็นอย่างยิ่งที่จะต้อง

ศึกษาแนวทางปฏิบัติ TOD แบบหลายมิติเพื่อให้เกิดการพัฒนา TOD ในพื้นที่สถานีในเขตกรุงเทพมหานครและปริมณฑลอย่างแท้จริง นอกจากนี้ การศึกษาแนวทางที่มีศักยภาพในการสร้างสรรค์การพัฒนา TOD ในเชิงปฏิบัติยังต้องการความร่วมมือระหว่างผู้มีส่วนได้เสียหลายภาคส่วนและการพัฒนาปรับปรุงพื้นที่รอบสถานีซึ่งจำเป็นต้องประยุกต์แนวทางเศรษฐศาสตร์เมืองมาใช้ร่วมกัน

Keywords (คำสำคัญ)

Transit-Oriented Development (การพัฒนาพื้นที่จุดเปลี่ยนถ่ายสัญจร)
Bangkok Metropolitan Region (กรุงเทพมหานครและปริมณฑล)
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Discourse Analysis (การวิเคราะห์วาทกรรม)
Urban Economics (เศรษฐศาสตร์เมือง)

1. Introduction

Controversies on the non-functional practices to overcome auto-lifestyles as the failure of achievement of sustainable transportation in big cities induce many state agencies' enthusiasm in providing schemes and channels to battle deterrents threatening the sustainability. As the 2013 United Nations Conference on Sustainable Development (Rio+20), the efforts on accomplishing sustainable transportation pursue the enhancement of synchronized transportation and land use planning with mixed use development and non-motorized mobility (walking and bicycling) together with modal shift strategy under 'the concept Avoid-Shift-Improve' (United Nations Conference for Sustainable Development [UNCSD], 2012); thus exemplifying the trend of Transit-Oriented Development (TOD) – a notion of a mixed-use and medium – to - high density development around a transit location vis-à-vis the easier walk access (Calthorpe, 1993). While, the 2013 TOD Strategic Action Plan by US Metropolitan Council highlighted the equitable TOD rather than the traditional TOD in that TOD district must indulge individuals of all credentials, ages and incomes with the opportunity to possess affordable housing and transport convenience towards quality of life (Metropolitan Council, 2013).

Nevertheless, not all cities, especially in developing countries accomplish in planning TOD or/ and transforming TOD ideas into actual implementation. One example is Bangkok, Thailand notoriously ranked for the World's Worst Traffic Congestion. In the metropolitan, metros (skytrain and subway), bus rapid transit (BRT) and the Suvarnabhumi Airport Rail Link (SARL) – the fast speed and high carrying capacity transits were built as expected to play a significant role in alleviating traffic jam; albeit accessibility performance of such transits have not well-performed in light of commuters' needs and abilities in case of Bangkok's experiences (Prasertsubpakij & Nitivattananon, 2012, pp. 56-65) brought by the lack of potential in sustainable transportation and land use development near transit lines in the areas of Bangkok (Vicheinsarn, Miyamoto & Rujopakarn, 2007, pp. 1250-1265). A new hope of integrating TOD practices into station-area development is not easy as our expectations due to influences of various factors and conditions.

The objective of this paper is to discuss how to make TOD works in Bangkok Metropolitan Region (Bangkok Metropolis and its adjacent provinces) based on the lesson learned on multidimensional obstacles, especially why the integration of TOD principles into land development surrounds transit station areas has become ineffective. The author hopes that the outcomes might provide the beginning of a new era for better land-use and transport planning in Thailand and inspires other urban planners towards sustainable city.

2. Approach and Methodology

A descriptive research was carried out to respond the study's objective. The descriptive section involves discourses on the historical evolution of transport and land use development and practices that have made Bangkokians relying on cars together with the silos that have prevented the combination of transportation and land use policy or/and a variety of rail-transit types and feeders or collectors (especially, bus and van) in Bangkok. Discourse analysis used secondary data from various agencies in the form of official studies, formal reports, and published articles. Moreover, we interviewed 15 key informants such as experts, developers and relevant officers in Bangkok Metropolitan Administration (BMA), Office of Transport and Traffic Policy and Planning (OTP), Bangkok Metro Company Limited (BMCL), Bangkok Mass Transit System Public Company Limited (BTSC), Bangkok Mass Transit Authority (BMTA), State Railway of Thailand (SRT), etc. The data from the interviews and reviews were used to provide insights related to

various components and conditions of TOD that possibly influence Bangkokians to shift from cars to mass rapid transits. Furthermore, we surveyed and observed some routes of BTS, MRT, BRT and SARL to investigate the actual situations as well.

3. Literature Review: Approaches and Multi-components of TOD

Developing TOD implication in the city would influence people's behavioural responses to choose rail-based transit services over the other modes residents or less reliant on private cars for daily trips (Mckibbin, 2011). TOD is paramount to build a good pedestrian environment in planning which makes the easier access to station area. With TOD design, the distance that individuals are willing to walk to access transit should be identified, for instance in Chinook Station, Calgary, the distance that a person will walk to reach the transit is equal to approximately a 5 minute walk, or about 400 to 600 meters (Bajracharya & Khan, 2005). Example of Lund et al. (Lund, Cervero & Willson, 2004) verified that modal share of mass transit at different TOD areas is ranged from 45% at San Francisco's Pleasant Hill BART station to 3% at Los Angeles' Long Beach Metro station. The mean of modal share in entire study areas is 27%.

In the traditional idea of TOD addressed by Calthorpe, the conceptualization of TOD as a mixed-use development nearby 2,000 foot walking distance from transit station or transit hub surrounded by commercial, residential, retail, office, open space and park areas, that demonstrated a diversity of land uses and landowners (Salvesen, 1996, pp. 31-35). In the same year, the study of Bernick and Cervero (Bernick & Cervero, 1996) was introduced to publicity, in which TOD was compared as "boutique planning" of a compact center around transit station as similar to Bae (Bae, 2002, pp. 9-18) enabling more people to use mass transportation that can be accessed by walking or bicycling (Boarnet & Compin, 1999, pp. 80-95). TOD in this era has more concerns on the physical design than socioeconomic factors such as community engagement that was argued by other TOD researches after such period.

Indeed, Transit-oriented living tend to be grasped residential location choices and home environment (Belzer & Aulter, 2002, pp. 51-58) within an easy walk to a public transit node, lifestyle preferences, employment near rail stop (Cervero, 2006, pp. 41-55) or other trip purposes (shopping mall, entertainment, plaza, and so forth) that attract a number of commuters; thus indicating TOD concept genuinely captures the peoples' preferences and perceptions about housing, mode and destination choices as similar as physical features of a station area i.e., footpath, bicycling lanes, street, block layout, etc.

If considering development scale, tactics to make TOD works require the understanding the regional network of transit neighborhood beyond individual station development (Anderson & Zimbabwe, 2011) involving the harmonization among schemes and strategies at all levels of government, transit and housing authorities, developers, and related stakeholders for city planning. In this era, TOD would accomplish the smart growth concept with a sense of livable community and place (The Center for Transit-Oriented Development [CTOD], 2008).

4. Bangkok's Situation of Transportation and Land use Development

4.1 Urban Transit Dilemma: why Bangkok cannot successfully tackle traffic problems?

The study of Bangkok's transport system development according to reviews illustrates how inherent land use and transportation policies and plans have remarkably made Thais reliant on cars, gradually reshaping the lifestyle in Thailand. If we look back the past decades, it obviously grasps that, Bangkok has been growing uncontrollably with unplanned scattering or sprawl of residential areas

and informally built lanes. Even though mass rapid transit lines (BTS, MRT, BRT and SRT lines) were developed in city, the transit network doesn't go through the large settlements outside of the inner Bangkok, and access to stations always involves a mixed-access mode pattern (Prasertsubpakij & Nitivattananon, 2012, pp. 56-65). Moreover, transit feeders or collectors (such as bus, van, etc.) to make commuters complete their trip could not be efficiently provided (Tangphaisankun, Okamura, Nakamura & Wang, 2010) and walking to feeders and mass rapid transit stations is inconvenient due to long distance, barriers on sidewalk (i.e. street vendors) and poor walking facilities (Chalermpong & Wibowo, 2007, pp. 1806-1819), (Townsend & Zacharias, 2010, pp. 317-330); thus aspiring people to own cars leading to congestion crisis recognized as the significant problem.

Although several professional local and international agencies have attempted to find solutions for the traffic problems in Bangkok, the problems still remain and become more complex and hard to handle. It can allude that traffic problems must be responsible for worsening of lifestyle socially, culturally, politically, economically, and environmentally. An important question here is why Bangkok cannot successfully tackle traffic problems. In answering this query, our history of transport development or the situation in different major Bangkok era needs be analyzed and different aspects of transport system development are intensively discussed to clarify the previous transportation performance and suggestion required for moving toward future transport development.

Before 1900, people in Bangkok used to live near rivers and canals building their houses (boat-houses) along the riverbanks. That lifestyle can still be traced along the Bangkok's waterway network (Poboon, Kenworthy, Newman & Barter, 1994). The density of houses along the riverbanks was higher than anywhere else. Life was not very complicated and river was the natural base of living standards and needs. The lessons based on the river have influenced people skills, knowledge, culture and even wisdom to improve their lifestyle. In addition, river and canals such as Chao Phraya River, which passes through the center of Bangkok, also served the main purpose to protect the capital city. As far as transportation is concerned, water transportation was basically the main means of travel in Bangkok similar to the neighboring countries. Bangkok was known as "Venice of the East" owing to its comprehensive networks in water transportation. That era is often remembered for its traditional and peaceful life. The loss of that era is mentioned in many urban development discussions. Until the mid-1800s as the colonial period, Thailand intended to be modernized and imported the western ideologies towards progress in the technological and commercial development simultaneous with trying to protect the sovereignty. Since then, Thai society has been influenced by the western, especially in transportation development. During this period, Bangkok got complaints from foreigners on the quality of transportation; hence in response to such complaints, Bangkok made a critical decision to launch building road and bridges (Rujopakarn, 2003, pp. 3302-3315). The development was spread to rural areas, and then the residential areas were changed from riverbanks to roadsides (Suthiranart, 2001). However, without a good plan, Bangkok lacks of road hierarchy as a main root of traffic burden. Poboon (Poboon, Kenworthy, Newman & Barter, 1994) addressed that if comparing the similar case between Central Bangkok and Central London and other European countries using the typical comparative diagrams of the road system, the majority of secondary roads in Central Bangkok are dead-end, leaving main roads to carry an excessive share of traffic congestion.

In December 1999, two skytrain (BTS) routes started operating in the BMR. The Bangkok Metropolitan Authority (BMA) assigned a 30-year concession, which was to be privately financed, to Tanayong Plc. Five years later in 2004, the second metro system, the

Mass Rapid Transit Subway (MRT) was officially launched. The Mass Rapid Transit Authority (MRTA) granted the Bangkok Metro Company Limited (BMCL) a 25-year concession to operate the service. Both the skytrain and the subway systems were built in the Central Business District (CBD) of Bangkok, which includes downtown areas of Siam, Silom, Sathorn and Sukumvit roads [4]. After that one line of bus rapid transit (BRT) (Sathorn-Rachaphreuk route) were brought to Bangkok in 2010. BMA and OTP proposed the new 12 routes plan; however the BRT operation was dissatisfied by public. In 2011, the Airport Rail Link was introduced to city by State Railway of Thailand so we always call 'SRT-Airport Rail Link connecting downtown Bangkok and Suvarnabhumi airport, with a maximum train speed of 160 kilometres per hour operating from 6 am to midnight with every 15 minutes; while the Express Line leaves every 30 minutes. The City Line begins with Phaya Thai station and passes other 7 transit stops before reaching the airport with a flat rate of 20 THB (0.61 USD) for one trip during the promotion period. Currently, City Line fares range from 15 - 45 THB (0.46-1.37 USD) upon the distance travelled; while 2 packages of Express line (Suvarnabhumi Airport Express-Makkasan and Suvarnabhumi Airport Express –Phaya Thai) are pricy 150 THB (4.57 USD) for round trip and 90 THB (2.74 USD for single trip). Similar to BRT, the system operation has never been popular owing to few passengers and short of money. We can observe that overall Bangkok mass rapid transit system failed due to worsen traffic congestion. Moreover, it's unfortunate that policy related to government-sponsored 100,000 THB (3,047.39 USD) tax breaks to first time car buyers supported more and more cars pouring onto city's streets. So, 470,000 new cars were registered with totaling of 3.18 million private cars in Bangkok as of the end of 2012. Eventually, more than 7.5 million were in Bangkok when including all types of registered vehicles as recorded by Ministry of Transport, Thailand (Ministry of Transport, 2013). So, right now we can say that 'Bangkok is a car priority city'- a massive traffic jam, dreadful walkability, high effluences and energy consumption as well as a big payment for all those infrastructure upgrades.

4.1.1 Accessibility issues of the BTS skytrain and MRT subway

As known from the theory that mass transit lines are supposed to follow land use patterns; But in Bangkok, it was happened in opposite way, in that land use patterns have shaped following the metro lines. The office buildings near BTS started filling up and after about five years, new development such as new office buildings and condominiums are all clustered around BTS stations, so the transit have brought 'the rich' to the new area resulting in the unequal transit access - the widest gap of access to metro between rich and poor.

In the next coming years, the Office of Transport and Traffic Policy and Planning (OTP) of the Ministry of Transport, Bangkok Metropolitan Administration (BMA) and Mass Rapid Transit Authority (MRTA) have planned and decided to move ahead with the construction of metro line extension such as completed MRT Blue Line and BTS Sukhumvit and Silom lines, MRT purple line, MRT orange line, MRT pink line, MRT Gray line and MRT yellow line. However, according to metro accessibility performance of the existing line, levels of access to metro station were quite low in multi-aspects (Prasertsubpakij, 2012). Incompatibilities between transportation—land use—users—services were found as metro accessibility impediments supported by illustration on Bangkok sprawling (Denpaiboon & Kanegae, 2007), long-walking distance to station, pedestrian behavior, poor feeder connectivity and employment accessibility issue (Vichiensan, Malaitham & Miyamoto, 2011, pp. 886-899).

4.1.2 Criticisms on route design and unplanned-structure of bus rapid transit (BRT)

The success of BRT in the cities of developed countries triggered Bangkok Metropolitan Administration (BMA) initiated BRT project and launched in 2010.

Albeit from project beginning to date, the project can't stop people using their cars. Based on investigation, BRT has not fulfilled its expectation on fast travel with speed only 5km/hr at peak hours. Based on observation, the BRT route along Narathiwat-Ratchanakharin Road was built and operated by segregating bus lanes; while its section along Rama III to Ratchapruek Road as a terminal station is partly segregated. In addition, narrow flyovers and bridges on Rama III Road force BRT buses to re-enter to the normal traffic lanes. Together with lack of expertise of BRT's driver, BRT takes longer travel time than usual. Most of motorists criticized that due to losing one lane for BRT, they were bumper-to-bumper huge traffic congestion in the Rama III Bridge area. Moreover, some motorcyclists who are impatient with the traffic cut into the BRT lane and it is unfortunate that the police do nothing to stop them.

Currently, in morning and evening peak hours, BRT ridership levels are about 17,000 passengers per day; but facing few users in off peak. The future of the BRT is ambiguous as the extension plan for another 5 BRT routes in other parts of Bangkok have been put on long term hold.

4.1.3 Longstanding unpopularity of Suvarnabhumi Airport Rail Link (SARL)

Chamroon Tangpaisarnkit, chairman of the 28-kilometre SRT Electric Train Co which runs the Airport Rail Link addresses that Suvarnabhumi Airport Rail Link (SARL) announced not charging the flat 20-baht fare for SARL City Line due to unsuccessful service to attract users causing a loss of almost 2 million THB per month during operation (Bangkok Post, 2013, January 3).

In addition, the State Railway of Thailand (SRT) has been advised to improve facilities of SARL to facilitate commuters the level of convenience as a consequence of complaints from users at the starting of operation in 2011. It was found that the services and facilities at stations were poorly remarked with no escalators and trolleys for passengers with heavy luggage. Moreover, stations have no car parking and no facilities connecting the stations to public transport and main road such as SRT- Ban Thap Chang Station causing public dissatisfaction.

Also, service was considered to be costly for a trip. The SARL has been inundated with service problems. Travelers also complained about uncomfortable seats and doors on the train closed with heavy force. So, its service has not met the expectations as only around 700 passengers per day were recorded in the last year below the target of 2,200 passengers per day.

4.2 Anatomy of Transportation and Land Use Planning

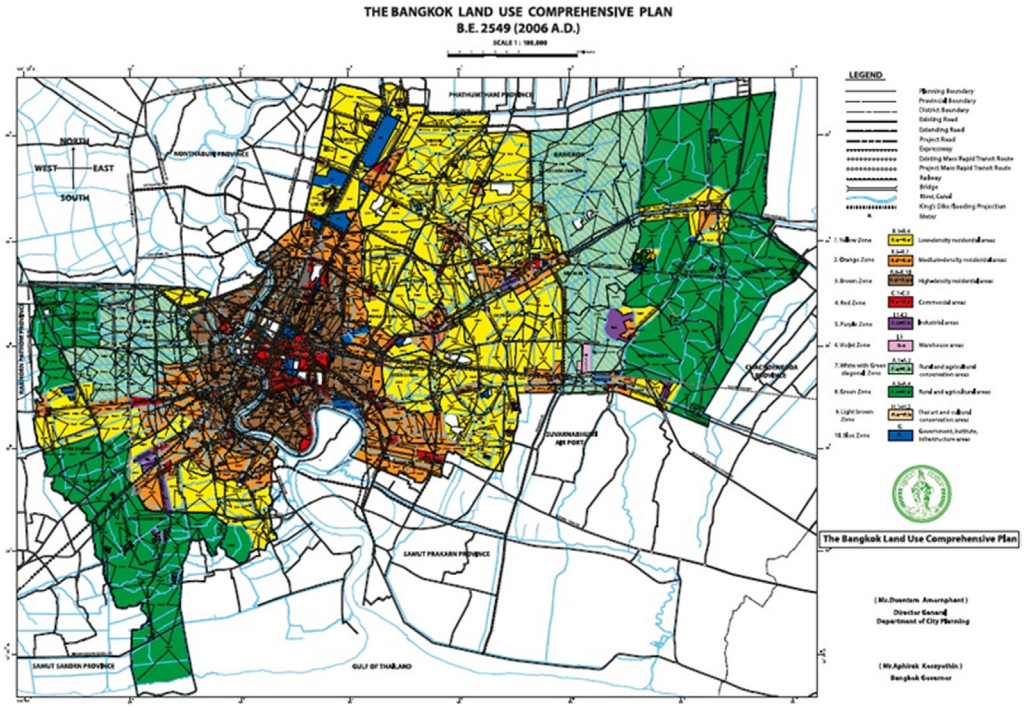
The 30-year Bangkok Comprehensive Plan was first introduced in 1960 developed by American consultants. This plan encompasses a map of land use and transportation as well as infrastructure projects covering the areas of Bangkok and its vicinities. In 1971, the Department of Public Works and Urban Planning improved the original 1990 City Map plan to be appropriate with the population growth and then was enacted for enforcement in 1975. After that the Department of Town and Country Planning has play an important role to develop a comprehensive city planning for Bangkok. This plan covers only Bangkok metropolis areas (Wasuntarasook & Hayashi, 2013).

Before the expiration period of plan enforcement, BMA provides the 1st upgrading of Bangkok Comprehensive Plan, called as Modifier 1. This version contains not only a set of land use map classified by utilization, communication and transportation map but also vacant land. After Modifier 1, the Bangkok Comprehensive Plan 2006 as updated Comprehensive Plan No.2 was enforced under a ministerial regulation as illustrated in Figure 1. This version is better than the old version due to adding a floor area ratio (FAR) and open space ratio (OSR) as well as conditions related to FAR Bonus. The new version classified categorized land use pattern into 10 typologies

including yellow zone (low-density residential areas), orange zone (medium-density residential areas), brown zone (high-density residential areas), red zone (commercial areas), purple zone (industrial areas), violet zone (warehouse areas), white with green diagonal zone (rural and agricultural conservation areas), green zone (rural and agricultural areas), light-brown zone (Thai art and cultural conservation areas), and blue zone (government, institute and infrastructure areas).

However, the updated version 2006 (Bangkok Metropolitan Administration [BMA], 2006) (see Figure 1) still lack the integration between land use and transportation planning combined with poor enforcement thus causing Bangkok sprawling that affects people in difficult approachability from their houses to metro system and other public transits. In this regard, we can perceive that during that period, Bangkok has no plans to develop urban compact functions. Metro lines have also not been well organized and coordinated with other public transport networks that were mentioned in the study of Punpuing and Ross (Punpuing & Ross, 2001, pp. 43-50). In fact, metro alignments are in the center of Bangkok but residences are scattered in its surrounding area that can obviously see from the greater demand of single-homes in Bangkok suburban. Hence, transport network connectivity and feeder systems (bus and paratransits e.g., van, hired-motorcycle and taxi) are seen immensely important to support commuters in easy access to metro services; albeit the actual situation appears in contrast. So, road-based transportation systems still have obtained top priority.

Lack of efforts to integrate land use and transportation systems may impose negative effects. Recommendations can be suggested to encourage



Source: Bangkok Metropolitan Administration (Bangkok Metropolitan Administration [BMA], 2006).

Figure 1 Bangkok Land Use Comprehensive Plan 2006

city and transport planners in promoting urban agglomeration and the potential of Transit-Oriented Development (TOD). As the Bangkok declaration 2020 –Sustainable Transport Goal no.2 for 2010-2020, BMA intends to develop mixed-use and medium-to-high densities along key corridors within Bangkok through suitable land-use strategies and provide pedestrian access, actively develop TOD. It is believe that it would alleviate negative consequences from insufficient and inefficient provision of public transportation services, and enhance urban transport sustainability.

4.3 Silo practices: A fragmentation between transport and land use sectors and among transportation units

However, one of impediments TOD implementation in Bangkok is that the new challenge exhibits a mismatch to the nature of the institutions that exist. Related Agencies driving force TOD goals seem to be fragmented and independent by functioning with narrow directives. Those responsible for managing traffic and transportation system are institutionally separated from those responsible for land use planning and management.

Indeed, an administration encompasses multiple line bodies carrying out multiple tasks and different interests (Klinsrisuk, Nitivattananon & Wongsurawat, 2013, pp. 1227-1244) which might lead to inefficient problem-solving. There are various agencies with responsibilities in the metro sector in Bangkok, as shown in Table 1 These agencies involve BMA, transport department, public enterprises (MRTA) and metro companies (BMCL and BTSC), State Railway of Thailand (SRT). Moreover, there are national governments, provincial governments (authorities of peri-urban Bangkok) and other authorities that are responsible to implement the metro services. It is unavoidable that a large number of agencies related to metro planning, operation and implementation creates conflicts due to uncoordinated works. It is always a difficult job in the pattern of multi-agent planning and implementing form.

5. Discussions: How to make TOD works in Bangkok and its adjacent provinces

Overcoming obstacles of TOD integration into all station area types (such as transit center, downtown, neighborhood, suburban center etc.) is a challenge for Bangkok Metropolitan Region (BMR). The study pointed out that poor integration between land use and transportation planning, enforcement of land use regulations and silo effects are the main causes of inaccessible mass rapid transits. Furthermore, it is not easy to frame the context of TOD in the study area according to these reasons as well. Unlike urban planning abroad such as European Countries, The United States, Canada, Japan, Hong Kong aspiring TOD models, mass rapid transits in BMR were initially built without any initiatives of TOD. Especially, the existing metro lines were constructed when Bangkok faced a dilemma related to urban sprawl as known that ideas on TOD integration just came to the country in the past few years. So, many versions of TOD guidelines from other cities may be unable to put in place here directly. In addition, without the studies of BMR transportation and land use characteristics for land redevelopment (Dittmar & Ohland, 2004; Dunphy, Cervero, Dock, McAvey, Porter & Swenson, 2004; Cottrell, 2007, pp. 114-121; Zhang, 2007, pp. 120-127; California Department of Transportation, 2009; Portland Devleopment Commission, 2014) improvement of transport connectivity (Tangphaisankun, Nakamura & Okamura, 2009, pp. 34-39) and accessibility (Prasertsubpakij & Nitivattananon, 2013; Curtis & Scheurer, 2010, pp. 53-106) simultaneous with various TOD dimensions such as TOD financing options (United States Environmental Protection Agency [US EPA], 2013; Gihring, 2009; Cervero & Murakami, 2009, pp. 2019-2043) regulatory mechanisms and incentives (City of Vancouver, 2004), socioeconomic concerns (i.e. affordable housing (Utter, 2005; Cervero, 1994, pp. 174-183; Center for Transit Oriented Development [CTOD], 2004) community outreach (Soursourian, 2010, pp. 22-45), lifesyles (Prasertsub-

Table 1 The existing agency functions of mass rapid transit services and feeders in Bangkok

Existing Functions	Mass Rapid Transit System			Mass Rapid Transit Feeders or collectors				
	BTS-skytrain	MRT–subway	BRT	SRT	Bus	Van	Taxi	Motorcycle-taxi
Policy and planning								
Line extensions	OTP	OTP	BMA, OTP	SRT	BMTA	BMTA	Private	Private
Land use & Accessibility	BMA	BMA	BMA	SRT	BMA	BMA	-	-
Program development and management for infrastructure provision								
Design	BMA	OTP, MRTA	BMA	SRT	BMTA	BMTA	-	-
Facilities construction preparation & management	BMA	MRTA	BMA	SRT	BMA	BMA	-	-
Delivery of works	BMA	MRTA	BMA	SRT	BMTA	BMTA	Private	Private
Maintenance facilities	BTSC	BMCL	BMA	SRT	BMTA	BMTA	Private	Private
Service delivery regarding operation and maintenance								
Service delivery provisions	BTSC	BMCL	BTSC	SRT	BMTA	BMTA	Private	Private
Ticketing and marketing	BTSC	BMCL	BTSC	SRT	BMTA	BMTA	-	-
Service specification	BMA	MRTA	BTSC	SRT	BMTA	BMTA	Private	Private
Contracting and contract compliance	BMA	MRTA	BMA	SRT	BMTA	BMTA	Private	-

Note: BMA = Bangkok Metropolitan Administration; BMTA = Bangkok Mass Transit Authority; BMCL = Bangkok Metro Company Limited; BTSC = Bangkok Mass Transit Company Limited; MRTA = Mass Rapid Transit Authority of Thailand; SRT = State Railway of Thailand; OTP = Office of Transport and Traffic Policy and Planning.

Source: Key informant interview, 2013.

pakij & Wasinrat, 2014; Arrington, 2009, pp. 39-48) private sector investment (Fogarty & Austin, 2011) and market conditions (City of Denver, 2009; Reconnecting America and Center for Transit-Oriented Development, 2008; Cervero, Murphy, Ferrell, Goguts & Tsai, 2004; Curtis, 2011; Murakami & Cervero, 2010) and multi-stakeholder involvement for development partnership (Cervero, Ferrell & Murphy, 2002; Belzer & Aulter, 2002) the implementation of this initiative in BMR seems to be impossible. Hence, the TOD guideline suitable for BMR may be drawn on the following suggestions.

Firstly, as mentioned earlier, creating TOD in the station areas involves collaboration among multiple stakeholders that have the important roles in the stage of the TOD implementation, concerned as the difficult stage of the integration between transit node and place. Such actors also set out the financial resources to accomplish TOD development process. According to this study, silo phenomenon brought by fragmented unit and regulatory together with piece-meal development of mass rapid transit lines is a major obstacle in developing and implementing TOD. Hence, to make TOD happens in the study area,

various actors (i.e. planning organizations, transit agencies, developers, financial institutions, State and local government, community, etc.) can mutually work in reaching TOD goals. For example, in station-area development, transit agencies, developers, local government and community take the lead in stimulating TOD, especially transit agencies which take responsibility on land adjacent to stations and developers can provide joint development as a key success - like a case of TOD development in Hong Kong (Cervero & Murakami, 2009, pp. 2019-2043) where the integrated rail-property development model have been applied. Another example is California model (Cervero, Ferrell & Murphy, 2002) which uses policy tools for promoting and leveraging TOD in order to make land redevelopment via the collaboration of public-sector actors (including redevelopment agency, transit agency and municipality). In this regard, redevelopment agency and transit agency jointly allow the use of agency land, help with land assembly and provide financial incentives. Also, transit agency gives permission on sharing of parking. Simultaneously, the municipality has a potential role on fast tracking reviews. In the case of TOD development and implementation in US, it can be seen that the local government always becomes the main actor to champion the long-term vision for site development. In addition, community is a source of local knowledge in planning activities, for example in developing affordable housing. Ultimately, it is essential that TOD will be developed on the basis of residents' needs.

Secondly, an insight into multi-perspectives of TOD is quite important. Based on reviews, it can be grasped that there should be a move beyond traditional TOD studies, which have so far focused on only land use base. Balanced integration of multifaceted factors of TOD, such as institution, regulatory and policy, socioeconomic, integrated transportation and land use and environment dimensions, can be applied for how to make TOD works in BMR. Currently, BMR has ongoing projects that need to be carefully designed by addressing different aspects. And finally, planning of land redevelopment associated with urban economics theory may be a choice of solutions. Making TOD works in BMR may also generate high costs. Provision of financial and tax incentives (Cervero, Ferrell & Murphy, 2002) - such as grants, loans, tax abatement; tax increment financing; public-sector financial participation; benefit assessment districts and enterprise zones, is required in the TOD implementation process.

6. Conclusions and Recommendations

As concerning in this study, a way to achieve 'the Avoid-Shift-Improve concept' in BMR involves the success on TOD development and implementation. Discourses on the lesson learned from the past interpreted the strong evidences on the failure of land use and transport integration and silo practices in the city. The design of future transit station neighborhood or/ and redevelopment of existing station areas require the knowledge and understandings of urban economic choices, cooperation among potential actors, and visions on multidimensional TOD. It is interesting that the context of TOD implementation regarding the regulatory, institutional and socioeconomic aspects (i.e. affordable housing, community outreach, lifestyles, private sector investment and market conditions) should be grasped by urban planners. The study also gave successful examples of station area TOD Studies such as Hong Kong and California that reflect potential works in TOD goals at station level. For the further researches, the citywide TOD or/and regional TOD strategic plans should be brought into the discussions. With regard to fragmented organizations, the next research may direct to the study of strategies that consider initiative cooperation or concession model among agencies.

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