

## Chapter 1

# Transit-Oriented Development: The Stations' Renaissance and Integrated Development

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**Abstract:** The Thai government plans to shift the country's main transport mode from road and air links to trains. Will the railway transportation mode be a good way for Thailand to change? Rail transport is the new transportation trend in the world. This study discusses that trend based on the simulation results using the IDE Geographical Simulation Model. Railway infrastructure itself generates a smaller economic impact than expected, and the improvement of connectivity and higher frequency of train services will also generate a small benefit also. Rather, the increase in productivity by the service sector is necessary for larger benefit. The productivity achieved by the service sector can be increased by urban development at and around the railway stations. Transit-oriented development (TOD) that jointly develops the railway and urban cities as a set is effective in generating the density of people and jobs. The Hong Kong MTR, which is a transit agency that provides a railway service and leases property, may be an extreme model of TOD. But, the Hong Kong MTR model may be applied to big cities. The Japanese private railway system is an integrated development model that develops railway services, residential sales, retail, and leisure complexes along the railway that are profitable, although they are expanding office leasing at stations due to the maturing society and slow growth of the population.

Keywords: Transit-oriented development (TOD); land value capture (LVC); transit-oriented integrated development, station renaissance; high-speed railway (HSR); urban planning; the peak car usage; density; productivity of services

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## 1. Introduction

The Deputy Prime Minister of Thailand, Somkid Jatusripitak, has announced the government's plans to shift the country's main transport mode from road and air links to

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the railway (Bangkok Post, Dec. 27, 2017). He said that Thailand must be the main hub among the CLMVT [Cambodia, Laos, Myanmar, Vietnam and Thailand] countries,..and rail transport will be the key player here (Bangkok Post, July 12, 2018). Indeed, in recent years, Thailand has been expanding its rail transport infrastructure rapidly in many ways: 1) Mass rapid transit master plan in Bangkok and its metropolitan area (M-MAP1); 2) Double track railway development; 3) High-speed railway development; and 4) Transit plans for the provinces. There are five transportation projects for Khon Kaen, Chiang Mai, Phuket-Phangna, Nakhon Ratchasima, and Udon Thani.

Several research questions arise. What transportation infrastructure mode best meets the ongoing globalization? What benefits are expected from railway transportation? Can the high cost of railway infrastructure be a commercially feasible transport mode in Asia? How can the high cost of the railway infrastructure be financed? This study aims to answer these questions. For this purpose, the following Section 2 introduces globalization's unbundling, and considers what transportation modes best meet the globalization's unbundling. Section 3 discusses the economic impact of railway transportation. Section 4 introduces the concept of transit-oriented development (TOD), whereby transit and urban development at and around stations are connectively developed. Section 5 introduces the land value capture that manages to finance the high cost of transit-oriented development. The last section reviews the experience in Japan.

## **2. Globalization's Three Unbundlings and the Transportation Modes**

Baldwin's latest book (2016), *The Great Convergence*, offers a new view of globalization by using the term 'unbundling', meaning a separation. At first, Baldwin has paid attention to three distance costs: 1) The cost of moving goods (shipping cost, transportation cost), 2) The cost of moving ideas (communication cost), and 3) The cost of moving people (face-to-face interaction cost). These three costs of moving matter, because they accelerate industries and shape globalization's unbundling.

### **2.1. The Globalization's Three Unbundlings**

#### **2.1.1. The first unbundling (globalization's first acceleration)**

Due to the improvement of transportation technology, the shipping cost fell first. But, the cost of moving ideas fell less, and the cost of moving people remains the most costly. This unbalanced reduction of costs generated income gaps between the developed and developing countries. Since markets have expanded globally but industry has clustered locally, the developed countries exported their manufactured goods as the shipping cost fell. The production and consumption separated in the first globalization (the first unbundling), is shown in Figure 1-1.

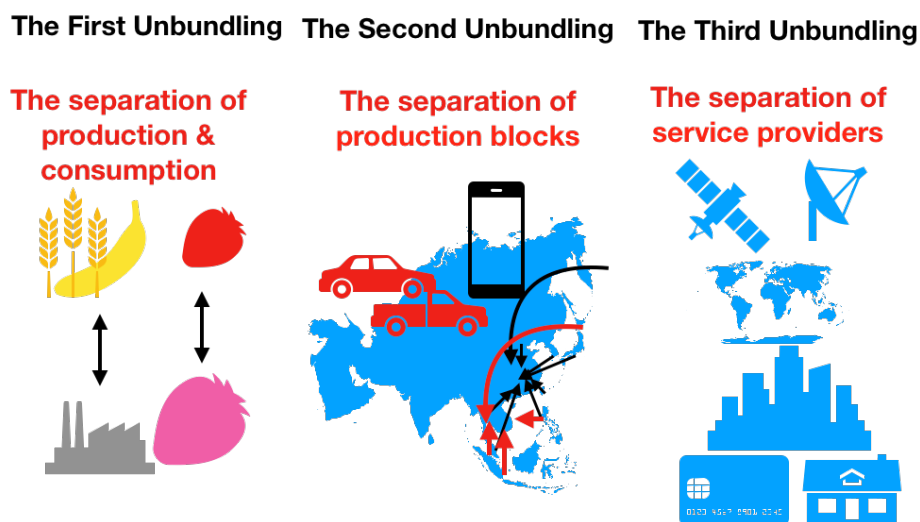
#### **2.1.2. The second unbundling (globalization's second acceleration)**

Globalization accelerated from around 1990, when information and communication technology developed, which lowered the cost of moving ideas (communication cost).

Why (2016) do we use the term 'ideas' to explain the second unbundling, or the supply chains? There are various solutions and ideas about what parts and from where they are purchased, what logistic routes are used, where a final product is assembled, and finally

to where and what logistic routes are used for shipments? There are various solutions. An idea differs by company, which shapes the supply chains. For a supply chain where production blocks are located across countries, communication with the suppliers and logistic companies becomes important. If such communication works well, that is, the communication costs fall enough, the production blocks separate and are located across countries, developing supply chains (the second unbundling).

**Figure 1-1: Globalization’s Unbundlings**



Source: Compiled by the Author

### 2.1.3. The third unbundling

The third unbundling is generated by the reduction of the cost of moving people (face-to-face interaction cost). But, the cost of moving people is still expensive, because it includes the salaries of managers, technicians, and experts, and thereby factories tend to agglomerate in a few neighboring countries. Baldwin (2016) predicts that the development of telecommunication technology makes it possible to substitute people crossing borders to share “brain services,” which will accelerate the third unbundling through the face-to-face cost. Such technologies are “telepresence” and “telerobotics.” *Wikipedia* defines that “telepresence” refers to a set of technologies which allow a person to feel as if they are present, to give the appearance of being present, or to have the effect, via telerobotics”, of being in a place other than their true location.

Today, the Internet and cloud computer services have transformed business models and business activities. Big data has been pooled through the Internet’s cloud computing services by technology platforms in their own right. The big four of Google, Apple, Facebook, and Amazon (GAFA) have driven innovation in this digital technology era although their platforms may differ. Interestingly, the business model has been transformed from selling goods to providing services of using goods through the Internet. For instance, Microsoft used to sell the permanent license disc for Office 2010 or Office 2016 to customers, but nowadays it provides the service for using Office 365, including a one terabyte cloud storage service, through the Internet, on a monthly

subscription basis or a yearly basis.

Also, it is noteworthy that due to big data pooling through cloud computing services, artificial intelligence (AI) technology has been developing rapidly, and the interaction between big data and AI technology through cloud computing services has generated innovation from one to the other. This development has substituted professional human tasks more than people can do in the various services fields, such as healthcare, biotechnology, robotics, agriculture, construction, transportation, and so on. Such innovation in technology accelerates services.

## **2.2. Transport Mode for the Globalization's Three Unbundlings**

### **2.2.1. Transportation mode for the first unbundling**

What transport mode best meets globalization's three unbundlings? The first unbundling carries agricultural and mineral products from a developing country to a developed country and manufactured goods from a developed to a developing one. The ship was the key transportations tool (Table 1-1). In recent years, due to the development of cold storage technology, fresh fruit and fish are carried by air. The JETRO 2017 Survey found that the required number of days from the arrival of freight to the completion of import custom clearance varies by country. The average required days by the sea freight is 10.1 days for the Philippines, 9.9 days for Indonesia, 7.8 days for Thailand, 7.3 days for Vietnam, 6.8 days for Malaysia, and 5.2 days for Singapore. The average days required by air freight is 4.7 days for Indonesia, 3.6 days for the Philippines, 3.2 days for Malaysia, 3.1 days for Vietnam, and 2.6 days for Thailand and Singapore. The required number of days from the arrival of freight to the completion of import customs clearance should be shortened further.

### **2.2.2. Transportation mode for the second unbundling**

The second unbundling carries parts and components for assembly in the supply chains. The key transportation tool is by truck, although some lighter parts, such as electronic parts are sometimes carried by air (Table 1-1). Under market competition, a core firm wants to minimize the total costs composed of the production costs and logistic cost. The road and air transportation infrastructure meet the second unbundling requirement.

### **2.2.3. Transportation mode for the third unbundling**

In the third unbundling, the movement is people. People want to shorten the travel time in the third unbundling. As for long-distance travel, people want to travel by air, but for short and medium distance, people prefer the trains to the car because trains are more punctual and faster than cars, and people can check e-mail and information by smartphone on the train. In the digital economy, train is the strategic transportation mode in the third unbundling where people use smartphones and tablets during the travel time.

**Table 1-1: Transportation Modes to Meet Globalization’s Three Unbundlings**

	The First Unbundling	The Second Unbundling	The Third Unbundling
The separation of	production and consumption	factories (supply chains)	services
The movement of	goods	ideas	people
The cost of movement	shipping cost	communication cost	face-to-face interaction
Transportation mode	ship truck	truck air	air train

Source: The Author

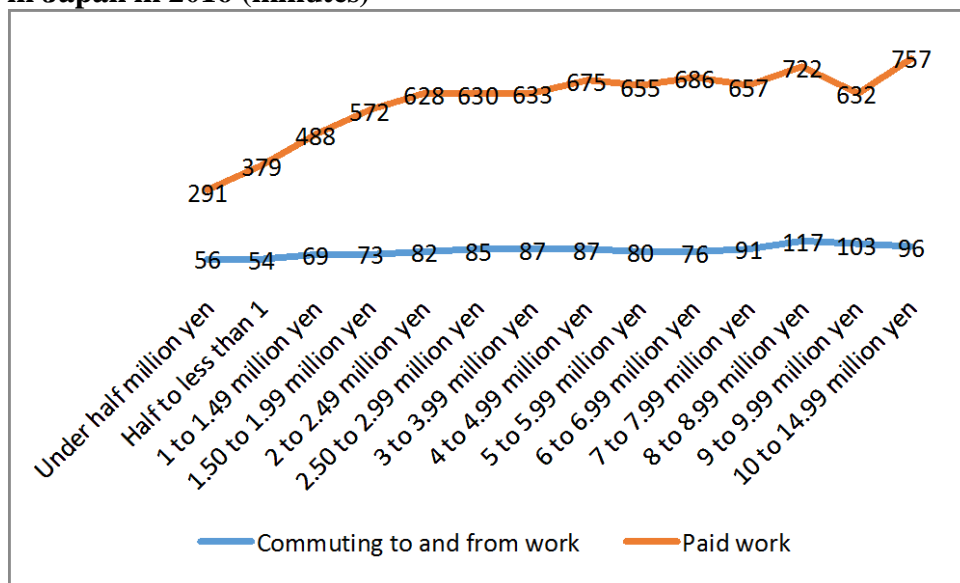
### 3. The Economic Impact of Urban Transit and High-Speed Railways

#### 3.1. Travel time budget

The mean traveling time per day, strictly speaking, the mean “exposure time,” or two ways, for man, which fixes the distance, or a *range*, that is a territory, is around one hour per day (Marchetti,1994). This travel time behavior is the mean all over the world, over the year, and over cultures, races, and religions.

According to the American Community Survey, the average commuting time for a full-time worker is 52 minutes for both ways in the U.S. This travel time tends to be longer in major cities such as New York and San Francisco. The commuting time in Japan is longer than that in the U.S. The Statistical Bureau of Japan released the survey on time use and leisure activities in 2016. The average time spent on commuting to and from school or work on weekdays is one hour and 19 minutes for Japan, that is, 39.5 minutes for each direction. The commuting time to and from school or work for people living in Kanawaga is the longest among all the provinces in Japan, one hour and 45 minutes, followed by one hour and 42 minutes in Chiba, one hour and 36 minutes in Saitama, and one hour and 34 minutes in Tokyo.

**Figure 1-2: Commuting time to and from work and paid work time on week days in Japan in 2016 (minutes)**



Source: 2016 Survey on Time Use and Leisure Activities "Time Use Results for Japan"

It is noteworthy that the commuting time tends to be longer for the higher income groups. In the U.S., the poor man walks 5 km per day, while the very rich people travel 500 km per day, and the rest is between these two. The average travel time per car driver is less than 0.7 hours for a low-income household, and nearly 0.9 hours for a higher income household. (Marchetti,1994). Travel time for workers tends to be longer for high income households in Japan. Figure 1-2, shows the weekday commuting time to and from work and the weekday paid working time by income. The weekday commuting time of employees whose income is under a million and a half yen to less than one million yen is 56 and 54 minutes respectively. For those earning 8 to less than 9 million yen, and 9 to less than 10, it is 117 minutes and 103 minutes per day respectively. These figures imply that low-income workers get jobs around their hometown, but on the contrary, higher-income workers can access far distant work places, suggesting the development of public transportation would improve access for lower-income people and provide better job opportunities.

### 3.2. Urban transit, density, and productivity

Urban mass transit system that links an intra-city shapes the city. It increases the population density as well as employment opportunities and the number of offices, shops, restaurants, residents, and public utilities. Train stations are becoming more central in a city and then the job density where the productivity of such a city is higher. Service providers, such as IT related providers, finance, R&D, professional service providers, wish to locate within the economic density area where they can access a large number of customers and suppliers, and thereby they can increase their productivity. Apple shops are located in high productivity areas. There is much evidence that density increases productivity. Salat (2016) shows evidence that doubling job density in London increased economic productivity by 10 percent. Job density in the Square Mile has increased by 30 percent during the last 10 years, and productivity per job in the Square

Mile is twice that of Greater London and three times that of the United Kingdom (Salat 2017). A doubling of employment density in U.S. cities corresponds to a 6 percent increase in hourly labor productivity (Haughwout 2009). The density of employment increased productivity was observed in Asia also. Economic productivity in China has increased by 8.8 percent by a doubling of the employment density (Fan 2007).

### **3.3. High-speed railway and the integration of cities**

On the other hand, the high-speed railway has a different role within the one-hour travel time budget. Technology allows faster and faster means of transportation. High-speed railways can integrate cities along the railway into a greater business region. In the Beijing–Tianjin–Hebei region, in 2000, the one-hour commuting trip in any direction would only get to a citizen to the boundaries of Beijing’s administration zone, and the average travel time to all the prefectural-level cities was around three hours to three and half hours with regular speed trains. In 2010, however, after implementation of the high-speed railway, the one-hour commuting time would reach five times as far, and the average travel time to all the prefectural level cities become around one hour to one and a half hours within the high-speed railway area. The high-speed railway area has expanded access for commuters, and has integrated the cities in the Beijing–Tianjin–Hebei region (Zhang et al. 2017).

### **3.4. Service by the high-speed railway system**

Equally important, the high-speed railway has a function to restructure the economy from manufacturing oriented to service-oriented. The high-speed railway tends to increase services and decrease manufacturing for short distances while increasing manufacturing for long distances (Li and Xu 2006). By using the geographical simulation model (IDE-GSM) model, the IDE-GSM team has estimated the impact of the Bangkok-Rayong high-speed railway (HSR), about a 200km high-speed railway (Isono 2018). The Bangkok-Rayong HSR would increase production by the service sector but decrease that by the manufacturing sector of the high-speed rail stop provinces, as well as the country's overall total.

### **3.5. Impact of the high-speed railway is small**

Productivity of transportation differs according to the transportation mode. Melo et al. (2013) estimated output elasticity of transport as 0.088 for road, 0.037 for rail, and 0.027 for air. These estimations mean that railways generate less impact than roads.

Even a high-speed railway may generate a small impact. The impact of Bangkok-Rayong high-speed railway is estimated to increase Thailand’s GDP in 2015 by only 0.07 percent for the cumulative 10 years between 2025 and 2034. Even if the Bangkok-Rayong HSR links the three international airports of Don Mueang, Suvarnabhumi, and U-Tapao, and increases the operational frequency from one train every hour to every 30 minutes, the 10-year cumulative GDP would increase by only 1.84 percent, still small. These estimations imply that the economic impact of the high-speed railway is very small, even if connections to other transportation systems and frequency improve.

How can the cities along the high-speed railway be really integrated into a core city?

The fourth column of Table 1-2 shows that by the implementation of the Eastern Economic Corridor (EEC) program, Bangkok and the high-speed railway station districts are supposed to increase the productivity of service sector by 10 percent. In the EEC scenario case, Thailand’s GDP is predicted to increase by 70.03 percent.

The EEC simulation suggests that the physical railway infrastructure itself generates a small impact. Good transport connections to other transportation systems are necessary to switch from other transportation modes to transit. Moreover, in order to obtain a larger impact from the railway infrastructure, development of a city at and around a station is necessary, as this increases the density of offices, shops, employment, and population, of the station's district, and thereby increasing the productivity of the service sector.

**Table 1-2: Impact of the Bangkok-Rayong Three Airport Link High-Speed Railway**

	Bangkok-Rayong HSR	Three Airports Link + Frequent services	+EEC
<b>Unit: Million of US\$</b>			
<b>Thailand (GDP)</b>	297	7,653	291,719
<b>Manufacturing</b>	-30	-551	13,841
<b>Services</b>	327	8,207	278,148
<b>% of 2015 GDP</b>			
<b>Thailand (GDP)</b>	0.07%	1.84%	70.03%
<b>Manufacturing</b>	-0.03%	-0.48%	12.15%
<b>Services</b>	0.13%	3.25%	110.30%

Source: Estimated by the IDE-GSM Model Team, derived from Isono (2018)

## 4. Rise of Transit-Oriented Development (TOD)

### 4.1. Transit and house prices

The productivity by the service sector can be increased, as mentioned before, if the density of population and jobs around train stations are increased. Therefore, transit is becoming a new trend of the development strategy at the city level, and the use of transit is rising while the use of the car is decreasing in developed countries.

How does transit generate density? There are many studies on transit and productivity. Zhang et al. (2014) examined residential property prices using 8,601 samples of house sales in Beijing. Comparing the transit access premium among the bus rapid transit (BRT), light rail transit (LRT), and metro rail transit (MRT) in Beijing, they found that the MRT has a wider impact zone and the highest premium, but on the contrary, the bus rapid transit has none.

### 4.2. The peak car use and the rise of transit



It was in 2009 that the Brookings Institution recognized the first new phenomenon of the decline in per capita car use starting in 2004 in most US cities (Puentes and Tomer, 2009). Newman and Kenworthy (2011) found that car vehicle kilometers (VKT) per capita decreased between 1995-2005 in some European cities (London 1.2%, Stockholm 3.7%, Vienna 7.6%, and Zurich 4.7%); and in some US cities (Atlanta 10.1%, Houston 15.2%, Los Angeles 2.0%, and San Francisco 4.8%). Newman and Kenworthy (2011) examined the six possible causes of 'peak car use.' They are 1) Hitting the Marchetti wall (one hour travel time budget); 2) The growth of public transport; 3) The reversal of urban sprawl; 4) The ageing of cities; 5) The growth of the culture of urbanism; and 6) The rise in fuel prices. Newman et al (2013) explain more simply that the rise of urban rail and peak car use prevails through the relative reduction in the speed of traffic compared to transit time, as well as the cultural change that young people prefer to take smartphones and tablets during a transit and walk in the digital economy, whereby he knowledge economy and digital jobs are focused in city centers, and where the creative synergies between people occur.

#### **4.3. San Diego TOD guidelines**

Transit and walking urbanization has prevailed by city planning efforts. In 1987, Sacramento, California opened its first light rail line and the city hired an architect, Calthorpe, to develop a set of zoning guidelines for "Pedestrian/Transit Oriented Development." The first project for Sacramento by Calthorpe received national media attention. The New York Times<sup>2</sup> published an article calling the project a transit-oriented development and declared TOD "The next evolutionary stage of the American Suburb" (Carlton 2007). San Diego was faced with urban problems, such as traffic congestion, dwindling affordable housing, diminishing open spaces, air pollution, and socially isolated communities. In 1991, San Diego asked Calthorpe to redesign the city. Calthorpe developed the San Diego TOD guidelines. In 1993, based on the San Diego guidelines, Calthorpe wrote *The Next American Metropolis*, which codified the concept of transit-oriented development (TOD). Since then, TOD has become a modern urban planning and development tool (Carlton, 2007).

#### **4.4. The development of concept of TOD**

Calthorpe (1993) codified the idea of TOD as "a mixed-use community within an average 2,000-foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open spaces, and public use areas within a walking environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car." Also, other designers and planners have promoted similar concepts and contributed to the design of TOD. The Institute for Transportation & Development Policy (ITDP) has produced a TOD practice guide, setting out eight key urban design and land use principles for city planning (C40 Cities, 2016):

1. Walk: Develop neighborhoods that promote walking
2. Cycle: Prioritize non-motorized transport networks
3. Connect: Create dense networks of streets and pathways

<sup>2</sup> Newman, Morris; "Focus: Sacramento, Calif.; A Transit-Oriented Approach to Suburbia" The New York Times; November 10, 1991.

4. Transit: Locate development near high-quality public transport
5. Mix: Plan for mixed use
6. Density: Optimize density and transit capacity
7. Compact: Create regions with short commutes
8. Shift: Increase mobility by regulating parking and road use

TOD is a planning and design strategy that is compact, mixed-use, pedestrian- and bicycle-friendly, and closely integrated with mass transit by clustering jobs, housing, services, and amenities around the transport stations (Sala and Ollivier, 2017). They proposed the 3-value approach (3V):

1. Node value (a station in the public transit network);
2. Place value (the urban quality of a place and its attractions);
3. Market potential value (of station areas in human densities of residential and employment, and the future number of jobs by transit within 30 minutes).

TOD is the joint development of transit and urban infrastructure that is compact, dense, and mixed-use around transit stations. If well designed and well-coordinated by the concerned government and city agencies, and well implemented, then TOD becomes an effective tool for attracting knowledge-based industries and professional talent from inside and outside the country. The American Public Transportation Association (APTA) (2013), surveyed districts in various cities including Atlanta, Boston, San Francisco, , Deerfield, Denver, and Seattle. It drew three interesting effects concerning transit: "First, high-tech and high-value industries are attracted from other U.S. or international locations to cluster where public transit provides access to the required workforce. Second, better access for the workers enhances efficiency, and thereby generates net new economic activity. Third, various transportation efficiency gains." APTA (2016), which explored innovation in districts in Los Angeles, Raleigh-Durham, and Austin in addition to APTA (2013), found that 1) Workforce preferences alone can drive the need for public transportation access, 2) The presence of public transportation in an innovation district contributes to the competitiveness of an entire region, and 3) The younger, knowledge-focused workforce is attracted to areas with high-quality public transportation services.

Several studies have surveyed successful TOD cases. C40 Cities (2016) surveyed New York, Melbourne, Copenhagen, Singapore, Stockholm, Vancouver, London, and Paris, and found that these TOD cities have succeeded to "create vibrant, people-focused neighborhoods with maximum access to public transport and economic activity."

## **5. Land Value Capture (LVC)**

### **5.1. Land value capture (LVC)**

TOD has been recognized in the United States, Europe, Australia, Japan, Hong Kong, and Singapore. Then a question arises. Can the high cost TOD be applied to developing countries? How can such costly TOD projects be financed by developing countries? What is the best practice for financing transit-oriented development not only in developed countries but also in developing countries?

**Table 1-3 Comparison of TOD and LVC**

	Transit-oriented development (TOD)	Land value capture (LVC)
Operator	Land development	Transit operations
Development area	Around stations	Stations, or stations and around stations
Business	Mixed-use and high density complex	Rail and integrated development, including mixed-use and high density complexes, amenities

Source: Author

Suzuki et al. (2015), *Financing Transit-Oriented Development with Land Values*, paid attention to the fact that land value has increased through transit development. They paid attention to the fact that real estate values at and around stations increase in value after implementation of railway infrastructure projects, and they proposed the development-based land value capture (LVC) that railway operation business and real estate development business should be pursued by the same railway operator with full public cooperation. LVC not only generates funds for transit investment and operation and maintenance but also promotes urban development. They introduced two examples of the Hong Kong MTR and the private railway lines in Tokyo (Suzuki, 2015).

### **5.2. The Hong Kong MTR’s railway plus property (R+P) model**

In Hong Kong, the Hong Kong SAR, China, government gives exclusive property development rights of government-owned land at a before-rail market price to the transit authority, the MTR Corporation. Then, the MTR Corporation can operate the railway business as well as the property development business. The MRT Corporation has implemented transport investment and high density and mixed-use complex development at the underground stations. The Hong Kong MTR model’s distinctive feature is that the transit agency was privatized, and then it can conduct property development rights of low price government-owned land in addition to running the railway business (railways plus property: R + P), under the legal support of flexible zoning that allows the highest floor ratio to the railway stations’ combined mixed-use land project, so that the transit authority compensates the transportation investment and operation and maintenance cost. The keys to success are (1) A privatized transit agency, (2) Rights for the railway plus property development: R + P) of government-owned land, and (3) Legal support of flexible zoning that allows a high floor ratio.

### **5.3. Tokyo’s diverse and inclusive LVC model**

Tokyo’s experience, a 3500-kilometer extended railway network, provided a development-based LVC to finance railway investment with the revenue from real estate development (Suzuki, 2015). Land readjustment was mainly used in the urban redevelopment schemes, whereby the private railway corporations acquired low-priced agricultural land owned by multiple landowners for real estate development before the new rail lines came to the suburban areas. Multiple land owners organized a cooperative

entity for negotiation and achieved smaller and higher property value land parcels after the development of their land with roads, public utilities, parks, sidewalk pathways, station shopping plazas, and open spaces. Such land readjustment is more difficult in already built-up areas; therefore a stronger incentive is needed to ensure a profit by many land owners. Put differently, the instruments for land readjustment in Japan are inclusive through the stakeholders' consensus building whereby multiple land owners organize one cooperative entity. The residents are never deported by enforcement of the government's order.

## **6. Japan's Experience of TOD and LVC**

### **6.1. Transit-oriented integrated development**

Looking at Tokyo's LVC model from railway business operators' perspective, what are the special features of the success of railway business in Japan? In Tokyo, JR East has operated the Yamanote line (green line), which is the center circle line in Tokyo, and the Soubu line (yellow line) crosses the Yamanote line. Two subway operators of Tokyo Metro Co. Ltd and Toei Transportation (Tokyo Metropolitan Government) are allowed to operate inside the central line (Yamanote line). Besides these public railway operators, there are seven private railway companies operating railway services in Tokyo. They are, Tokyu, Tobu, Odakyu, Keio, Seibu, Keikyu, and Keisei.<sup>3</sup> These seven private railway companies are not allowed to operate inside the center circle Yamanote line, but outside it with connections to it. Private railway lines are connected to other private railway lines only through JR East's Yamanote line, Tokyo Metro and Toei Transportation. The many railway lines operating in Tokyo are well connected to each other, which has promoted riders away from cars to trains or to buses and trains.

Table 1-3 summarizes the actual performance of the 16 major railway operators in FY2017, ending in March 2018. Among the 16 major railway operators, Tokyo Metro used to be a governmental organization and has been privatized, but the shares are held by the government and the Tokyo Metropolitan city. Several interesting facts are observed from Table 1-3. First, a surprise is that all the major private railway operators are showing a profit surplus. This fact means that the railway operating business is profitable.

Second, private railway operators conduct various business based on the railway. Looking at the consolidated financial statements that includes all the related business, the consolidated operating revenue is somewhat bigger than the non-consolidated statement for the railway business. The consolidated operating revenue is 17.4 times that of the non-consolidated operating revenue for Nishitetsu, 7.8 times for Kintetsu and Sotetsu, 7.4 times for Tokyu and Hankyu, 6.5 for Meitetsu, 5.8 for Keihan, 5.1 for Keio and Seibu, 4.3 for Odakyu, 3.8 for Keisei and Nankai, 3.7 for Keikyu, and 3.5 for Tobu,

<sup>3</sup> On the other hand, in Osaka, there are five private companies operating railway services. They are Hankyu, Kintetsu, Keihan, Hanshin, and Nankai. There are three other major private railway operators in Japan. Meitetsu, operating in Nagoya and Nishitetsu, is based in Fukuoka, Kyushu. Sotetsu in Yokohama, and Kanagawa is one of the major private railway operators.

which are quite large compared to that of Tokyo Metro, 1.1. This fact indicates that the Japanese private railway companies conduct various related business based on their railway business. They conduct bus and taxi operations at the railway stations. Besides this transportation business, they work in common to provide a variety of related services, such as 1) Real estate business composed of housing sales and office leasing; 2) Retail business, such as department stores and supermarket chains; and 3) Hotel and leisure facilities, such as professional baseball teams, theaters, playing parks, and so on. These related services contribute to the number of riders, which makes the railway operation service profitable.

**Table 1-3 Performance by the Major 16 Railway Operators in Japan in FY2017**

	Number of passengers perday (million)	Total railway operation km	Number of station	Operating revenue of transportation (billion yen)	Consolidated operating Revenue (billion yen)	Consolidated operating profits (billion yen)
Tokyo Metro	7.4	195	179	376	426	97
Tokyu	3.2	105	97	155	1,139	83
Tobu	2.5	463	204	163	570	67
Odakyu	2.1	121	70	121	525	51
Keio	1.8	85	69	86	435	39
Seibu	1.8	177	92	103	531	64
Hankyu	1.8	144	90	103	760	105
Kintetsu	1.6	501	286	157	1,223	65
Keikyu	1.3	87	73	85	316	29
Meitetsu	1.1	444	275	93	605	47
Keihan	0.8	91	89	56	322	31
Keisei	0.8	152	69	67	255	30
Hansin	0.7	49	51	36	n.a.	n.a.
Nankai	0.7	155	100	61	228	34
Soutetsu	0.6	36	25	33	261	31
Nishitetsu	0.3	106	72	22	375	20

Source: Association of Japanese Private Railways (2018) Oote Mintetsu No Sugao (actual status of the major private railway companies)

## **6.2. The Kintetsu transit and tourism-oriented integrated development model**

A unique example of a private railway in Japan is the Kintetsu line. Kintetsu is an Osaka based transit company covering Osaka, Kyoto, Nara, Nagoya and Mie prefectures, and connects the two international airports of Kansai and Tyubu, as well as the very famous ancient cities of Kyoto and Nara, and the marine tourism places of Mie. Kintetsu has made more effort to develop tourism than the other railway operators.

**Table 1-4 Consolidated Operating Income of Kintetsu Group Holding**  
(JPY millions)

Segment information	2014/3	2018/3
<b>Operating income</b>	<b>54,623</b>	<b>64,643</b>
Transportation	30,371	29,206
Real estate	12,201	16,297
Merchandise sales	4,829	7,080
Hotel and leisure	5,799	9,627
Others	1,058	1,611
<b>Operating revenue</b>	<b>1,246,360</b>	<b>1,222,779</b>
<b>Transportation</b>	<b>222,577</b>	<b>228,186</b>
Railways	158,308	158,089
Bus services	34,326	34,677
Taxi services	11,554	11,497
Others	18,389	23,923
<b>Real estate</b>	<b>159,311</b>	<b>149,565</b>
Real estate sales	100,327	68,308
Building Business	22,250	45,849
Building management	42,630	40,966
<b>Merchandise sales</b>	<b>382,037</b>	<b>395,817</b>
Department stores	275,630	281,817
Stores and restaurants	108,102	115,286
<b>Hotel and leisure</b>	<b>500,475</b>	<b>478,669</b>
Hotels	48,931	61,183
Travel Agents	436,883	405,172
Cinema	3,216	3,544
Aquarium	–	9,015
Japanese-style hotel and leisure facility	11,593	–

Source: Kintetsu Group Holding, Fact Book 2018

Table 1-4 summarizes the consolidated operating income and revenue by segment, which tells us what business Kintetsu is engaged in. the Kintetsu Group's business is categorized into four segments: 1) Transportation, 2) Real estate, 3) Merchandise sales, 4) Hotels and leisure activities, and 5) Others. Among these, in FY 2017 ending in March 2018, the non-transportation business provided more than half of the operating profit.

Kintetsu's core business is the railway service. Like other Japanese railway service operators, Kintetsu provides bus transportation connection services, housing sales business, and retail business, which contribute to the railway business. However, due to the decreasing population in Japan, the transportation business has become a mature business. Indeed, the operating profit from transportation has decreased from 30 billion yen in FY 2013 to 29 billion yen in FY 2017. Instead, the building leasing business and hotel sector are growth areas for Kintetsu, although real estate sales have decreased due to the decreasing population in Japan.

### 6.3. Tokyu’s shift from a transit-oriented integrated development to urban development

Tokyu is one of the most successful railway operators for the real estate business. Based on the railway and bus business, Tokyu has expanded its integrated development business that is composed of a real estate business and shopping services along the railway lines. The main real estate business was housing sales through land development whereby the land prices were valued-up by the expansion of the railway and bus networks and the shopping centers along Tokyu's lines, as well as by well-designed town development. The average land values along Tokyu's lines has become the highest of the private railway lines in Tokyo.

The Tokyu transit-oriented integrated development business model was forced to change for the reason that population in 17 cities along Tokyu's lines grew very slowly. Based on the 2010 population census, Tokyu predicts that the population density along Tokyu's lines is expected to slow further, and peak in 2020. For the mature society, Tokyu has shifted its business from its transit-oriented integrated development to urban redevelopment, whereby offices at and around the stations are well redeveloped, so that the leasing value of offices and shopping centers has increased.

**Table 1-5 Major Office Properties of the Tokyu Corporation (March 2018)**

Project name	Planned completion date	Total floor area (m2)	Building height	Basement levels
1 Queen's Square Yokohama	Jul. 1997	496,596	36	5
SHIBUYA SCRAMBLE SQUARE	FY2019, (East			
2 (Shibuya Station Block)	building)	276,000	47	7
	FY2027 (Central,			
	West building)	95,000		
3 Futako Tamagawa Rise (Phases I)	Nov. 2010	106,750	16	2
4 (Phases II)	June. 2015	157,016	30	2
5 Shibuya Hikarie	Apr. 2012	144,546	34	4
6 Shibuya Mark City	Feb. 2000	138,620	23	1
7 SHIBUYA STREAM (Shibuya Station	2018 Autumn	116,700	35	4
8 Cerulean Tower	Mar. 2001	105,950	41	6
9 Setagaya Business Square	Sep. 1993	94,374	28	2
10 Tokyu Capitol Tower	Jul. 2010	87,428	29	4
11 Carrot Tower	Nov. 1996	77,365	27	5
12 JR Tokyu Meguro Building	Mar. 2002	52,221	17	4
13 SHIBUYA CAST.(Miyashitacho Plan)	Apr. 2017	34,981	16	2
14 Aoyama Oval Building	Oct. 1988	29,296	16	2
15 Yaesu Center Building	Sep. 1992	17,243	14	3
16 Shibuya Higashiguchi Building	Oct. 1980	17,037	11	3
17 Shin Mizonokuchi Building	Jan.1988	16,784	5	1
18 Tokyu Bancho Building	Sep.2011	16,756	11	0
19 Gotanda Fujikura Building	Oct. 1977	12,858	9	1

Source: Tokyu Fact Book 2018.

Table1-5 lists the major office properties of the Tokyu Corporation, which are leased. The Tokyo Open Carrot Tower, 41 stories above ground and 5 basements, in Sangenjaya in 1996. Since then, Tokyu has opened high-density office properties,

Queen's Square Yokohama with 36 stories in 1997, Shibuya Markcity with 23 stories in 2000, Cerulean Tower with 41 stories in 2001, Shibuya Hikarie with 34 stories in 2012. Some office building are located out of the central city area. They are Carrot Tower in Sangenjaya, Setagaya Business Square in Yoga, and Futako-Tamagawa Rise opened in 2010. Tokyu will develop the Minamimachida Grandberry Park that will be an urban development hub in 2019. Tokyu's business model is shifting from the integrated development of transit, real estate, and lifestyle business to the transit based urban development model.

**Table 1-6 Operating Income of the Tokyu Corporation**

<b>Consolidated Segment information</b>	JPY millions	
	2008/3	2018/3
<b>Operating income</b>	<b>86,734</b>	<b>82,917</b>
Transportation	33,907	29,002
Real Estate	24,945	32,357
Life Services	14,903	15,999
Hotel and Resort	6,893	5,103
Business support	6,035	0
Others	51	456
<b>Non-Consolidated Segment information</b>		
<b>Operating income</b>	<b>59,042</b>	<b>55,980</b>
Railway operation	32,207	24,609
Real estate	26,835	26,799
Real estate sales	12,387	7,011
Real estate leasing	14,447	19,787
Other business	0	4,572
<b>Operating revenue</b>	<b>256,167</b>	<b>269,564</b>
Railway operation	145,938	154,870
Real estate	110,229	95,593
Real estate sales	56,595	20,286
Real estate leasing	53,633	75,066
Other business	0	19,101

Source: Tokyu Fact Book 2018.

Table 1-6 summarizes the consolidated operating profit of the Tokyu Corporation by segment. Tokyu has segmented its business into four sectors: 1) Transportation; 2) Real



estate; 3) Lifestyle services; 4) Hotels and resorts; and 5) Others.<sup>4</sup> Transportation services include railway and bus operations. Lifestyle services include department stores, chain stores, shopping centers, cable TV, and advertising. Hotels and resorts include domestic hotels, leisure facilities, and associated services.

Looking at the operating profit, the real estate business is the largest business segment for Tokyu at 32 billion yen in FY 2017, ending March 2018, larger than the operating profit from the transportation sector at 29 billion yen. The real estate business is composed of real estate sales and real estate leasing. Real estate sales and leasing are quite different businesses. The former is sales to residents for the household sector, while the latter is an office rental business. Looking at the non-consolidated accounts, in FY2007, the operating revenue from real estate sales achieved 57 billion yen, while that by the real estate leasing sector achieved 54 billion yen. In FY 2017, the operating revenue of real estate sales decreased to 20 billion yen, but on the other hand, that by real estate leasing increased to 75 billion yen. Similarly, in FY 2007, the operating profit of real estate sales was 12 billion and that of real estate leasing was 14 billion yen. In FY 2017, the former decreased to 7 billion yen and the latter increased to 20 billion.

The lesson from Tokyu's experience, is that it has increased its operating profit from real estate leasing through office rental charges through the development of offices and shopping centers for leasing is the trend of transit-oriented development and land value capture (LVC). To be noteworthy, young people want to work and live along Tokyu's lines, and the population along Tokyu's lines is expected to increase by 2035.<sup>5</sup> This revised population forecast means that thanks to the urban redevelopment business model, young people want to work and live in fascinating and vigorous cities where Tokyo has redeveloped.

#### **6.4. "Station Renaissance"**

What is the key element to realize TOD and LVC? The East Japan Railway Company (JR East) gives us the know-how to finally realize TOD and LVC. JR East is one of the seven railway companies created in 1987 after the division and privatization of the government-run Japanese National Railway (JNR). It covers the Greater Tokyo Area, the Tohoku region, and the surrounding areas. The government held all the stock of JR East, and it was in 1993 when the JR East was listed on the Stock Exchange and the first round of stock was sold to the public in that year, the second in 1999, and the third and final in 2001. However, JR East had to get permission from the government for several important issues until 2001, when JR East was fully privatized and the JR Law Amendment Bill was passed.

With full privatization, JR East implemented "New Frontier 21," the first medium-term business plan from FY 2001 to FY 2006, which aimed to improve the consolidated cash-flow, the ROE (the ratio of net income to the shareholders' equity) and the consolidated ROA (the ratio of operating income to total assets). By being fully privatized, JR East could expand their related business. Currently, JR East categorizes its business activities into four sectors: 1) Transportation, 2) Retail and services, 3) Real

<sup>4</sup> The segment of business support has been reclassified into others since FY 2012.

<sup>5</sup> Tokyu Corporation Fact Book 2018.

estate and hotels, and 4) Others.

In FY2017, the transportation business amounted to 1,990 billion yen, 69 percent of total revenue, retail and services achieved 502 billion yen, 17 percent, real estate and hotels 326 billion yen, 11 percent, and others 2 percent. JR East published a booklet, *Lifestyle Service Business Growth Vision Next 10*, in 2018, that shows that since FY 2001 JR East has promoted the "Station Renaissance" program that changed from railway stations that people pass through to railway stations where people gather. Since FY 2018, JR East has challenged moving from "Railway station creation" to "Lifestyle creation" (town development). The lifestyle service business operating revenue (retail and services, and real estate and hotels) is expected to increase from 829 billion yen in FY 2017 to 1,200 billion yen by 2027, more than half of the transportation business operating revenue.

"Station Renaissance" is the transformation of stations from "people pass through" to "people gather," and then stations where "people can work, play, and live." "Station Renaissance" where "people can work, play, and live" is the same trend as Tokyu and Kintetsu, as mentioned before, whereby the leasing business of offices and shops is becoming the growth sectors for railway transportation businesses.

#### **6.5. Lessons from Japan's experience of TOD and LVC**

What are the lessons from the experience of Japan regarding transit-oriented development (TOD) and land value capture (LVC) for the Japanese partners, and for Southeast Asia including Thailand?

First, most importantly, the transit state enterprise, in Thailand, the State Railway of Thailand, should be privatized, and the development rights of government-owned land should be transferred to the privatized transit agency in which 100% of the shares are held by the governmental sector.

Second, equally important, the following legal arrangements are necessary.

(1) The land readjustment law:

The land readjustment law shall allow privatized transit agencies or private companies to acquire low-priced agricultural land owned by multiple landowners for real estate development before new railway line construction and related development. Negotiation between the land owners and railway operators should be a consensus based inclusive principle, so that each land owner achieves a higher property value land parcel after development of their land, and some compensation for living before moving away. For this, the land owners should organize a cooperative entity for the negotiation.

(2) The flexible floor ratio system:

The flexible floor ratio system should allow the construction of higher buildings for railway development projects. This is necessary not only to develop profitable railway projects but also to increase the number of transit riders.

(3) Commuting allowance system:

In Japan, many firms and governmental organizations cover the commuting cost between home and office, either by providing a one- (or three-, or six-) month travel

pass card, or by providing a commuting travel allowance, which is not assessed as income by the Tax Office. This commuting allowance system has contributed to development of the inland cities in Japan.

Third, after land development, real estate properties such as offices, shopping centers, and condominiums should be leased to public, which will increase the value of the privatized transit agencies. The land development should be well designed, in order to create high value from such real estate properties.

Fourth, after land value capture, the privatized transit agencies should be listed in the stock market, but some part of the stock should be sold to the public. With the funds raised by selling stocks, the government can allocate the funds for extension of the railways to suburban areas and to new projects in the provinces. The privatized railway agencies should operate the railway and the related businesses, including the real estate business.

## **Summary and Conclusion**

The Thai government plans to shift the country's main transport mode from road and air links to railways. Indeed, in recent years, Thailand has been expanding its rail transport infrastructure rapidly in many ways: 1) Mass rapid transit master plan in Bangkok and its metropolitan area; 2) Double track railway development; 3) High-speed railway development; and 4) Transit plans in the provinces. Therefore, several research questions arise. What transportation infrastructure mode is necessary for globalization? What benefit will be achieved by railway transportation? Can railway infrastructure be a commercially feasible transport infrastructure in Asia, and how can the high cost of such railway infrastructure projects be financed?

Baldwin argues three globalization's unbundlings. The driving forces of the first, the second and the third unbundlings are the reduction of 1) The cost of moving goods (shipping cost, transportation cost); 2) The cost of moving ideas (communication cost); and 3) The cost of moving people (face-to-face interaction cost) respectively. Since the human cost is very high, if the travel time can be reduced, this will reduce the cost of moving people, and then the third unbundling can progress.

Train stations are becoming more central in cities, and these areas can increase job density of the cities and the productivity will improve. There are much evidence that density increases productivity. High-speed railways tend to increase services. The simulation results of the 200 km Bangkok-Rayong high-speed railway suggest that the economic impact of the railway transport infrastructure is very small, and connections to other transportation systems and frequent services are very important to increase the number of riders and the switch from road to the railway services. More importantly, an increase in productivity by the service sector is necessary for the railway project's success. Such increase in productivity can be achieved by increasing the density of the population around the railway stations.

The new phenomenon of the decline in per capita car use has been prevailing in European and US cities. The rise of urban railways and peak car use prevails through the relative reduction in speed of traffic compared to other forms of transit, as well as cultural changes that young people prefer to use smartphones and tablets while in transit and walking in the digital economy, where the knowledge economy and digital jobs are focused in city centers, and where the creative synergies between people occur.

Facing urban problems, such as traffic congestion and air pollution caused by traffic, the concept of transit-oriented development (TOD), which is the joint development of transit and urbanization in compact, dense, and mixed-use around transit stations, is recommended. Indeed, in recent years, TOD has prevailed in the U.S., Europe, Australia, and China. If well designed, and well-coordinated by the concerned government and city agencies, and well implemented, TOD becomes an effective tool to attract human resources for the knowledge-based industries from inside and outside the country.

However, TOD implementation is very costly. How can TOD be financed by developing countries? Land value capture (LVC) is the tool to finance funds for TOD. In Hong Kong, the government gave exclusive property development rights of government-owned land at a before-rail market price to the privatized transit agency, the MTR Corporation. The Hong Kong MTR model is the best practice of LVC that a transit agency handles railways plus property (R + P) development under a flexible zoning program that allows the highest floor ratio to the railway stations' combined mixed-use land projects.

The Japanese private railway operators provide the other best practice regarding LVC. Facing a large number of agricultural land and residential owners, the legal arrangements of land readjustment laws allow the railway operators to acquire land for railway and related business development. Each land owner can get a small but higher value land parcel after land development in addition to a temporary allowance. Negotiation between the land owners and railway operators is consensus based, and they are not forced to move from their residence. For this, the land owners organize a cooperative entity. High floor ratio around stations also contributes to the success of railway related land development projects. The commuting pass allowance encourages to increase the number of transit riders. Under these legal arrangements, the Japanese private rail operators work in common to integrate their railway business with bus transportation, real estate residential sales, retail, and restaurant and leisure facilities. Some have developed the railway business with tourism attractions. In recent years, due to the maturing society and slow population growth, they all are expanding, to a greater or lesser degree, the office and commercial center leasing business. Transit-oriented integrated development has been changing to urban redevelopment that leases offices and commercial centers where people want to work and live.

These lessons suggest that, in the mid-sized Asian cities, the railway operators should first be privatized, and the necessary legal arrangements, such as land readjustment law and flexible floor ratio zoning system are needed. Then the railway operators should conduct the railway transit business combined with real estate residential sales and

Daisuke Hiratsuka, "EEC Development and Transport Facilitation Measures in Thailand, and the Development Strategies by the Neighboring Countries." BRC Research Report, Bangkok Research Center, JETRO Bangkok/IDE-JETRO, 2019

office and commercial center leasing. After land value capture (LVC), the stock held by the government should be sold to the public to raise the funds for development in the provinces.

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