



ASSESSING THE EFFECTS OF TRANSIT ORIENTED  
DEVELOPMENT ON LRT RIDERSHIP IN  
KUALA LUMPUR

BY

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## ABSTRACT

Malaysia has been undergoing rapid industrialization and economic growth since the 1970s. Kuala Lumpur, a bustling city in the heart of Malaysia is overwhelmed by traffic jams, where public transport is insufficient to cater to the population and therefore forces most people to drive their own cars. This is worsened by the ever spreading city limits and frequent rain that lashes the city invariably during peak travelling hours. To counter such issues, Transit-oriented development (TOD) can be one of the best solution to traffic congestion. TOD is a mixed-use residential and commercial area planned to maximize access to public transport. Public transport comprising of train and bus service offers a convenient option for people to commute and in the process helps reduce traffic congestion. An effective transit system needs growth pattern and community design that support transit use. It is only complimented by other activities and services located within the vicinity which makes it convenient for the people to commute, run their daily chores without needing a car. The goal of the study is to assess the impact of transit-oriented development on the passenger ridership of LRT based on the current land use development. To achieve this overall aim, a case study TOD which has good transit service is essential for research. A candidate case study mixed use development, the Wangsa Maju station, has been selected. Moreover, Taman Melati station is chosen as a comparative case study for evaluation of the TOD characteristics and the its impact on passenger ridership. Several land use maps and photos prepared to show land use surroundings. The overall observation of results shows that Wangsa Maju has good transit availability and therefore as a TOD represents a worthy case study. This research has found about how various types of land use and levels of density impact transit user. The result shows relation between density and passenger ridership, which take up more density positive effect to the higher LRT ridership. Efficient pedestrian walkway design , transit service and mix land use also relies on will also can be affected to positively to the higher ridership. This research also reviewed the significance and literature related to TOD, its operational attribute, and the extent to which it would help to urban problems in the city roads of Kuala Lumpur. Finally, suggestions were made for further research on topics related to the subject. The recommendations were made from the findings for improving the transit-oriented development activities along transit corridors. Thus, the research fulfilled its aims and objectives and added to the existing knowledge.

## ملخص البحث

تتأثر عملية التنمية في أي امة بالتعمير. إنها التنمية الواعدة البعيدة عن الأرياف والشوارع الرئيسية. هذه القرارات شجعت انتشار التجمعات شبه الحضرية ووفرت المزيد من المساحات لتطوير وتحديث طريقة الحياة المرتبطة بالسيارة. وبارتداد الضغط على الطرق, تحاول إدارات الطرق جاهدة حل مشكلة الازدحام المروري عن طريق توسيع و إنشاء طرق جديدة. و التي أدت في المقابل إلى تطوير أماكن بعيدة عن مركز المدينة والتي نتج عنها في المقابل وجود مزيد من السيارات في الطريق. هناك دائما حلقة مفرغة تعرف بحلقة الانتشار ويجب أن تتوقف. و في الواقع فان مخطط و شبكات النقل واستغلال الأرض وليس المسئولون المنتخبون لم يحلو مشكلة الازدحام المروري ولكن بدون علم قد تحسنت هذا وقد تغيرت وجهة النظر. فنظام تطوير التوجيه المروري (TOD) هو طريقة متكاملة للتعامل مع مشاكل المرور عن طريق اتخاذ قرارات ذكية فيما يخص استغلال الأرض وتطوير توجيه المرور هو طريقة تمكن من دمج استغلال الأرض و أنظمة المرور لضمان أفضل وصول إلى وسائل النقل العام و كذلك حل مشاكل أخرى. TOD, هو نظام مزدوج الاستعمال في المناطق السكنية والتجارية يهدف أساسا إلى تحسين الوصول إلى وسائل النقل وأنظمة النقل والتي تتضمن القطارات و الباصات تستطيع توفير خيار نقل مناسب و لعب دور مهم في التقليل من الازدحام المروري. إن أنظمة المرور الناجحة تتطلب مناهج متطورة و مخططات محلية تدعم استعمال وسائل النقل. بالإضافة إلى ذلك مزيج إضافي من الاستعمالات و النشاطات و الخدمات الجوارية التي تجعل من السهل بالنسبة لمقيمي (TOD) أن يصبحوا عاملين وان يؤسسوا مشاريع خاصة بهم و أن يقوموا بتوفير حاجياتهم الأساسية بدون الحاجة إلى سيارة. وفي نفس السياق. تعتبر كوالالمبور واحدة من المدن التي تعرف أزمة نقل خانقة و نقص في وسائل النقل العامة والتي ترغم العديد من المواطنين على أن يقتنوا سيارات خاصة بهم بالإضافة إلى اتساع جغرافية المدينة و تكرر ساعات الذروة الخاصة بالأمطار العاصفة. ولذلك و لفهم أكبر لفائدة لنظام (TOD) تم اختيار محطة القطار "وانغساماجو" "Wangsa Maju" و "تامان ملاتي" "Melati" "Taman" ضواحيها لتقييم حقل دراسة هذا النظام و خصائصه فيما يتعلق باستغلال الأرض. هذه الدراسة تستعرض أيضا أهمية الدراسة و كذلك الدراسات السابقة المتعلقة بنظام (TOD) و خصائصه العملية و إلى أي مدى يمكن أن يساعد في حل المشاكل المرورية في شوارع مدينة كوالالمبور .

## APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Urban and Regional Planning.

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## DECLARATION

I hereby declare that this dissertation is the result of my own investigation, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degree at IIUM or other institution.

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## LIST OF ABBREVIATIONS

CTOD	Center for Transit-Oriented Development
DBKL	Kuala Lumpur city Hall
KL	Kuala Lumpur
KLCP 2020	Kuala Lumpur City Plan 2020
KLSP 2020	Kuala Lumpur Structure Plan 2020
LRT	Light Rail Transit
MPS	Majlis Perbandaran Selayang
NPP	National Physical Plan (Malaysia)
PPA	People Per Acre
SJER	South Johor Economic Region
TCRP	Transit Cooperative Research Program
TOD	Transit Oriented Development
VTPI	Victoria Transport Policy Institute
et al.	et alia: and others
Ed.	Edition
Vol.	Volume

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 INTRODUCTION**

This chapter offers an introduction to the research and justifies the purpose of the study, then describes the goal, objectives and scope of study were determined as the guideline for the next stage actions. The significance and limitations of study were also identified in this chapter.

### **1.2 BACKGROUND**

Over the past forty years, we have witnessed a number of studies in the North America and the UK on the indirect benefits of rail transit systems. Some studies focus on the effects of rail transit systems on land use and development (see, for example, Huang, 1976; Giuliano, 1988; Cervero and Landis, 1997; Dziauddin, 2009.) whilst others emphasize land use development. Emphasis on land use development has taken into account the research on locational externalities that are generated by the rail transit systems, which in turn affect the residential and commercial land.

Calthorpe (1993, 56) defines TOD as:

“A Transit-Oriented Development is a mixed-use community within an average 2,000-foot walking distance of transit stops and core commercial area. TOD is mixed residential, retail, office, open space, and creative use in a walkable environment, make it convenient for and employees to travel by transit, bicycle, foot, or car.”

The defining elements of TOD identified by Calthorpe have not changed significantly in the contemporary practice of TOD: TOD is still defined as mixed-use, higher density and nodal form of development.



TOD is both an old and new concept with roots in the streetcar suburbs and satellite rail towns that were developed throughout North America during the late 19th and early 20th century, which themselves were influenced by Ebenezer Howard's Garden Cities (Bernick and Cervero 1997; Dunphy et al. 2004). According to Bernick and Cervero (1997), the original purpose of TOD and transit villages was to elevate transit to a “respectable means of travel outside the village.”

The nodal design of TOD and transit villages can be traced back to the earliest of rail suburbs of New York, where they formed “beads on a string” on a regional scale, and communities that circulate around a transit station on the neighborhood scale (Bernick and Cervero 1997). Each suburban community along the commuter rail-line contained enough daily amenities to be self-sufficient, and to keep people in their own communities; the spread of homes was limited to a walk-able distance from the railroad station, as only the very wealthy could afford a horse-and-driver to be able to live further into the countryside (Bernick and Cervero 1997).

TOD is both an ideological way to think about communities and a real-estate movement. Although nodal and linear transit-oriented development exists the world over, TOD as a specific approach to development can be credited to the work of Calthorpe. The book, *The Next American Metropolis* described environment, the group and the *United States Desire* (1993), architect and planner Peter Calthorpe is credited with introducing TOD into the broader discourse on smart growth and New Urbanism (Echenique et al. 2012).

In this context, TOD is limited to North America where it has gained remarkable popularity among municipalities in the United States (Bernick and Cervero 1997; Transit Cooperative Research Program 2002). Between 1992 and 2004, over 30 countries and municipalities in the United States have adopted TOD

ordinances (TCRP 2004). While exemplary forms of nodal development exist around transit exist in South America, Western Europe, and Australia (Bernick and Cervero 1997; TCRP 2002), examples are only beginning to coalesce in North American cities, especially in Canada.

Moreover, a study carried out by Podobnik (2002) that by maximizing the use of the public transport, the community has a great opportunity to know one another while going through regular shopping routines within the local area. However, it is important to note that the above-mentioned benefits/values associated with the construction of rail transit systems such as congestion relief, reduced per-capita road accidents, energy savings, environmental advantages, improved personal mobility for disadvantaged groups and transit-oriented development is well known. These benefits can conveniently be found through cost-benefit analysis, which is usually carried out by developers before any project can be implemented. Alongside the benefits of rail transit systems discussed above, other indirect benefits that are yielded from construction of rail transit systems have also been studied.

On the other side, the current rapid development activities have resulted in the increase of the needs and dependencies on motor vehicles. Uncontrolled development and urban sprawl have caused the ineffectiveness of the public transportation systems. It is a relation between land use and the fundamentals in transportation. They interact and relate to many other issues that are significant to the communities (Noland and Hanson, 2013). It is influential in having an efficient and effective public transportation service in a way to overcome problems like traffic congestion towards particular and high dependency toward private vehicles, especially in Kuala Lumpur.

It is imperative that public transportation services need to become more progressive and aggressive to solve the traffic problems besides convince the

community to use their services. Public transport is an integral part of community infrastructure, providing access to mobility for both business and social purposes (Easteal and Wilson, 1991).

A growing city is constantly harassed with traffic problems and to fight these problems in an effective manner, an effective public transport system is essential. City planners have given due consideration and prioritized public transportation system. Acts like 'Public Transport Promoting Acts; and the 'Public Transport Master Plan' have been constituted (Kim& Lee, 2008).

TOD by far has evolved to be one of the most significant measure to resolve various problems of a growing city which includes an overcrowded road network, provision of cost effective housing and air pollution (Cervero, Ferrel, and Murphy, 2002).

TOD is a part of land development concept known as "Smart Growth" and "New Urbanism." More often than not, cities grow at an unexpected rate, businesses flourish at an alarmingly high rate causing an influx of people into the city. This invariably leads to an urban sprawl as the urban areas grow uncontrollably and spread across a wider zone. This however reflects the inability of city planners to foresee the growth of the city during various stages including planning and decision making process (M. Rafee Majid , 2012).

In major cities in Malaysia, most people travel more than 45 minutes to the workplace by choosing to live in the suburban areas. In Kuala Lumpur, for instance, urban sprawl has been out of control, where development has been scattered up to 60 kilometer radius. Urban limit or urban growth boundary may be the solution that leads to a more-compact growth of a town, however it is not going to prevent its sprawl. Clear planning policies and sequential approach method needs to be implemented to

control development activities. Incentive and other facilities also need to be provided to the developer to encourage compact and smart growth development (Abd. Gahni @ Abd. Ghani, Zulazhar, 2013).

Therefore, emphasizing on well-being, quality of life and livability are the core of any urban project and the important factor in designing a city Centre. Mixed-use concept to encourage living, working and leisure activities in the same areas can reduce trip generation.

### **1.3 PROBLEM STATEMENT**

TOD concept is a newly developed approach in Malaysia. Currently, there is no specific transit-oriented development guideline in Malaysia. Some developers claimed that their development was transit friendly and in compliance with the TOD standard.

Moreover, uncontrolled urban sprawl development has resulted in the increase of traffic flow on major roads leading to the town Centre. Urban sprawl would also cause difficulty for public transportation service to provide comprehensive services. This would cause ineffectiveness of the public transportation service to serve the overall area (Abd. Gahni @ Abd. Ghani, Zulazhar, 2013).

Besides, in the Kuala Lumpur structure plan some issues have been identified, which is related to the TOD area which are:

- Low trains and buses modal share that puts the existing infrastructure under a lot of pressure and leads to traffic congestion.
- Insufficient parking lots in close proximity of train stations and bus terminals. There is also insufficient parking in shop lots shopping complexes.

- A pedestrian system is slowly but surely making its way into the City Centre. This will provoke more individuals to make use of facilities like covered walk ways connecting train stations and bus terminals to activity centers, facilitate inter connectivity of public transportation system in the process easing the traffic congestion. In the bargain this will influence people to use the public transportation network and prevent individuals from using their own vehicles for short distance travel.
- Lack of facilities and the required infrastructure for pedestrians.
- District centers based at Wangsa Maju and Taman Melati growing at a slower pace.
- Lack of cooperation between land use planning and rail based public transportation system.

Consequently, the government concedes public transportation, especially in light rail transit (LRT) as the decisive approach to relieve congestion on roads and to achieve the balance in the transportation system. However, in the effort to encourage people to use the light-rail transit (LRT), the main issue is mostly caused by the low ridership. Certain TOD characteristics such as density and mix land use may promote urban sustainable growth by reducing the use of private car and change to other alternatives such as LRT line. So, the passenger ridership will be the change when the level of TOD change.

These urban problems have decreased the quality of life in urban areas. It is important to forecast the consequences of TOD for planning with an understanding of the pattern, process and causes. Thus, it would require to consider all issues that have related to identifying the consequences of TOD.

#### **1.4 AIM OF THE STUDY**

The goal of the study is to assess the impact of transit-oriented development on the passenger ridership of LRT based on the current land use development.

#### **1.5 OBJECTIVE OF THE STUDY**

The following are the objectives of the study:

- i. To investigate the existing land use characteristics such as land use density, and diversity of mixed use in TOD area.
- ii. To evaluate the other transit-oriented development characteristics, including, pedestrian design and community services in the TOD area.
- iii. To analyze the relationship between transits oriented development characteristics and LRT ridership.
- iv. To provide recommendations that improve the transit-oriented development activities along transit corridors.

#### **1.6 STUDY QUESTIONS**

Does transit-oriented development characteristics effect on LRT ridership?

- Is there a positive relationship between density and LRT ridership?
- Is there a positive relationship between land use diversity and LRT ridership?
- Is there a positive relationship between pedestrian design and LRT ridership?
- Is there a positive relationship between community services and LRT ridership?

## 1.7 SCOPE OF THE STUDY

The aim of the study is to explore the relationship between transits oriented development characteristics and passenger ridership. The Wangsa Maju area in Kuala Lumpur is chosen as the study area and Taman Melati area as a second case study.

The reason select these two stations is firstly, the area is near to the UIA campus (Intenational Islamic University Malaysia), Secondly, based on the literature review, Wangsa Maju station is one of the most crowded and busiest LRT among the other stations along Kelang Jaya line. The table 1.1 shows the scope of study.

Table 1.1 The Scope of Study

NO.	Scope of study	Parameter
1	To evaluate the existing land use characteristics	<ol style="list-style-type: none"><li>1. The existing land use</li><li>2. The land uses pattern.</li><li>3. The density of residential, commercial and office</li><li>4. Population density</li><li>5. The provision of the mix use activities in surrounding station</li></ol>
2	To assess pedestrian design and community services.	<ol style="list-style-type: none"><li>1. The existing pedestrian circulation system and convenient pedestrian connection level.</li><li>2. The types, distribution and adequacy of community service along transit corridor, including existing parking spaces, feeder bus and taxi</li></ol>
3	To identify the LRT passenger ridership.	<ol style="list-style-type: none"><li>1. Passenger volume</li></ol>

## 1.8 STUDY LIMITATION

The main goal for this research is to evaluate the relationship between LRT system and TOD characteristics by analyzing and comparing and explore its impact along

transit corridor. Generally, Kelang Jaya line consist total of 24 stations. The data can be perfectly accurate and comprehensive if the data are collected at all 24 stations. However, it is limited and focused on only two stations Wangsa Maju and Taman Melati Station.

Although there are several aspects of TOD characteristics that can be the effect on the usage on LRT. While this study is restricted to finding out density, land uses diversity, pedestrian design and community services.

Moreover, another limitation of this study is lacked of some baseline data as certain data which it can be gotten from public sector such as passenger ridership. If it obtained average daily of passenger volume data from the public sector, the results of this study were more accurate. Therefore, only average hourly passenger volume was counted along two chosen stations.

## **1.9 SIGNIFICANCE OF THE STUDY**

This study is about effect of TOD on transit ridership, which is significant in many ways:

- At first, it benefits the residents and the public at large as the findings of the research can help in improving their lives.
- In addition, it helps the policy makers, administrators, politicians, etc. Who are involved in the decision and policy making to form policies and Strategies to improve development of a Transit-Oriented Development.
- It contributes to the field of urban planning as planners could make use of the findings in their designs to enhance the well-being of the residents.