

Mass Rapid Transit (MRT) and Urban Transformation: A Case Study of Kuala Lumpur's Damansara

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v14-i4/21221>

DOI:10.6007/IJARBSS/v14-i4/21221

Published Date: 05 April 2024

Abstract

Kuala Lumpur and its suburbs (Damansara) have witnessed rapid growth fuelled by the Mass Rapid Transit (MRT) system. While the MRT's role in improving travel is clear, its broader influence on urban development and population dynamics remains under-explored. This study investigates this crucial link within Klang Valley. We employ a two-pronged approach: secondary data analysis and field surveys. Population census data (2010-2020) from the Department of Statistics Malaysia (DOSM) and MRT-related information will be analyzed. Additionally, field surveys at MRT stations will provide first-hand observations of development trends. Our primary focus is the potential correlation between MRT stations and population density. We hypothesize that improved accessibility via the MRT has driven population growth around stations. This research examines changes in population density to shed light on the MRT's role in shaping urban development patterns. These findings will inform future urban planning and infrastructure development in Kuala Lumpur. Furthermore, this research contributes to understanding Southeast Asian urban development around public transportation. By studying Kuala Lumpur's MRT experience, the project offers valuable insights for other regional cities considering similar infrastructure investments. Ultimately, we emphasize the importance of sustainable urban development (SDG 11) in creating inclusive and resilient cities.

Keywords: Mass Rapid Transit (MRT), Urban Development, Population Dynamics, Public Transportation, Sustainable Development (SDG 11)

Introduction

Urban rail transit systems are being designed and developed to reduce congestion and foster economic growth in city centers (Song et al., 2018). This emphasis on efficient transportation promotes an increase in population density in these urban areas, driving a trend toward more

sustainable urban development. This shift represents a global reimagining of urban transportation planning. Many major cities face challenges like inadequate public transit, over-reliance on private vehicles, and crippling traffic congestion. Rail transport, known for its efficiency in moving large numbers of people, is gaining momentum as an effective solution to these urban challenges. Malaysia, in particular, is adopting this trend, investing in rail infrastructure to address these transportation issues (Man & Majid, 2024a; 2024b). The shift towards rail transport demonstrates a strategic move away from car-centric urban design, promoting more sustainable and efficient public transit systems (Gossling, 2017). By integrating rail networks, cities aim to reduce traffic congestion, lower carbon emissions, and create more connected communities. Malaysia's approach to expanding its rail network underscores a broader commitment to addressing the transportation needs of growing urban populations while aligning with global trends in sustainable urban planning. The integration of rail transport in Malaysia has significantly impacted various aspects of the country, including its economy, society, and urban development.

In 2017, mass transit systems worldwide served a staggering 53 billion passengers, witnessing a notable increase of approximately 9 billion passengers since 2012 (Wang et al., 2018). This surge was particularly prominent in Asia and the Middle East-North Africa region. Asian transit systems alone cater to an annual ridership of over 26 billion passengers. In comparison, European routes handle more than 10 billion passengers, Latin America nearly 6 billion, and North America (including the U.S. and Canada) only 3.7 billion passengers (Richard, 2018). The Eurasian region leads in metro network utilization, with an average of 117 trips per capita last year (Farid et al., 2020). However, it's noteworthy that Eurasia is the only region experiencing a decline in per capita journeys (Mat et al., 2018). In Malaysia, as reported by Malaysian Transport Statistics (2021), the MRT rail transport service recorded 19,573,010 passengers in 2021, utilizing the MRT service to reach specific destinations. The Mass Rapid Transit (MRT) system in Malaysia consists of three primary lines: the Kajang Line, operational since December 16, 2016; the Putrajaya Line, which commenced operations in June 2022; and the Circle Line, scheduled for implementation in 2028 (MRT Corporation, 2023).

The Malaysian government's commitment to improving Kuala Lumpur's public transportation infrastructure materialized with the Mass Rapid Transit (MRT) project. In a bid to address traffic congestion and improve connectivity within Kuala Lumpur, Prime Minister Dato' Sri Najib Razak announced the Mass Rapid Transit (MRT) initiative in June 2010 (Berita Harian, 2010). Following a thorough evaluation and planning process, the project was officially approved by December of that same year. Construction began in July 2011 on the first MRT line, the Kajang Line. This 47-kilometer line featured a combination of elevated and underground sections, with 9.5 kilometers running beneath the city (Khoo & Ooi, 2023; Kadir et al., 2020). The Kajang Line boasted 29 stations in total, with 7 strategically positioned underground to serve high-density areas. This initial line aimed to address the existing transportation challenges faced by a rapidly growing Kuala Lumpur, whose population was projected to reach 18 million by 2020 (Department of Statistics Malaysia, 2010 Population and Housing Census). Recognizing the need for further expansion of the MRT network, construction of the second line, the Putrajaya Line, began in response to the city's burgeoning population. This 57.7-kilometer line, operational since June 16, 2022, stretches from Sungai Buloh to Serdang and concludes in Putrajaya, the federal administrative center (MRT Corporation, 2023). Similar to the Kajang Line, the Putrajaya Line incorporates both elevated

and underground sections, with a total underground distance of 13.5 kilometers. Notably, the Putrajaya Line boasts 10 new underground stations, further enhancing accessibility for residents and commuters. The ongoing development of the MRT system signifies a significant milestone in Kuala Lumpur's urban transportation landscape. By providing a fast, reliable, and efficient mode of public transport, the MRT aims to contribute to a more sustainable and well-connected city in the future-

Mass Rapid Transit (MRT) has emerged as a significant alternative in urban transportation infrastructure for the past few decades. The presence of MRT has not only revolutionized how urban residents move but also transformed land use patterns and addressed issues related to rapid urbanization processes such as traffic congestion and environmental degradation. Das (2020) identified rapid urbanization in Malaysia as a key factor driving increased private vehicle use. This surge in vehicles has resulted in severe traffic congestion during peak hours in major cities. To address this challenge and accommodate rapid urban growth, Asian countries like China, Singapore, and Malaysia have made significant investments in Mass Rapid Transit (MRT) infrastructure. These investments aim to alleviate pressure on existing transportation networks and promote sustainable urban development. The potential for this approach to contribute to a more sustainable future, through environmental benefits, social improvements, and economic growth at local and global scales, is a key motivator for this research (Yahya & Safian, 2023; Man & Majid, 2024a, 2024b).

Kuala Lumpur's Mass Rapid Transit (MRT) system has emerged as a transformative force for the city's transportation landscape. Beyond its immediate impact on travel patterns and commute times, the MRT's influence on urban development dynamics is attracting increasing attention. This study delves into one such aspect: the potential influence of MRT stations on population distribution and density. By leveraging the most recent 2020 Malaysian census data, we aim to explore this crucial question. Examining changes in population density within districts served by MRT stations offers valuable insights into the spatial patterns of population growth and potential MRT-related effects.

Further research is warranted to explore the impact of urbanization triggered by MRT construction. This research should focus on the potential escalation in population density and the corresponding rise in utility demands within the affected area. The study's significance lies in its ability to demonstrate the temporal changes experienced by areas receiving rail infrastructure like the MRT. It is expected that the area will undergo advancements and development due to the establishment of various infrastructures such as hospitals, educational institutions, and shopping centers

Study area & Methodology

Study Area

Damansara, situated within the Kuala Lumpur region of Malaysia, is a rapidly developing area along the Klang River valley (Tajudin et al., 2021). Initially dominated by rubber plantations and agricultural land, Damansara has undergone a significant transformation since the late 1980s (replace NBAM1 with a more reliable source, e.g., a government report or historical study). This transformation has positioned Damansara as a key residential, commercial, and corporate hub. The area is further distinguished by its diverse offerings. One notable feature is the renowned 1 Utama Shopping Centre, one of Malaysia's largest shopping malls (Besar,

2018). Additionally, Damansara boasts a vibrant business scene with numerous business centers and restaurants, catering to various needs. Recreational facilities also contribute to the area's appeal.

Damansara's educational landscape is another significant aspect. The presence of colleges, international schools, and higher education institutions attracts families seeking a well-rounded living environment with access to quality education. Damansara's population has witnessed a significant increase, rising from 245,543 in 2010 to 468,939 in 2020 (BANCI 2010; BANCI 2020). This growth can be partially attributed to its transformation and improved accessibility. Damansara benefits from several MRT stations, including TTDI (Taman Tun Dr. Ismail), Bandar Utama, Surian, Phileo Damansara, and Kwasa Sentral stations. These stations provide convenient connections to other parts of Kuala Lumpur, further enhancing Damansara's desirability. Today, Damansara remains a dynamic and sought-after area for living and investment within Malaysia. Its diverse amenities, robust infrastructure, and educational offerings contribute to its appeal for both residents and visitors seeking a high-quality lifestyle within the Kuala Lumpur metropolitan area.

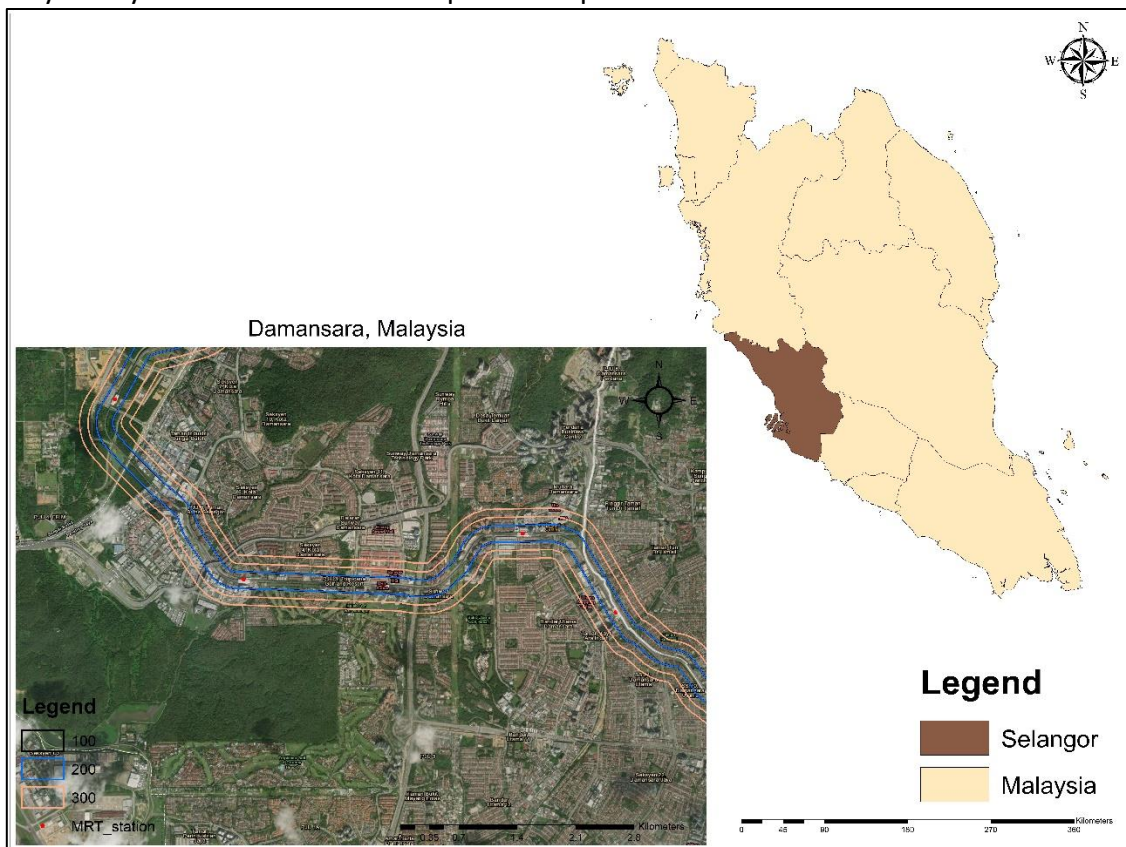


Figure 1.0: Study area Damansara, Malaysia.

Analysing Secondary Data

In conducting secondary data analysis, we employ population data of the study area provided by the Department of Statistics Malaysia (DOSM). Population data from 2010 and 2020 will be utilized for analysis purposes. By tapping into this resource, we can analyse demographic trends and changes in population composition without the necessity of direct data collection. This method enables us to grasp the social dynamics within the area and pinpoint factors influencing population growth and distribution more efficiently. Secondary data analysis

involves examining and interpreting existing data gathered by others for different purposes (Johnston, 2014). In this scenario, we are utilizing population data from the Department of Statistics Malaysia, which has been compiled through periodic censuses or surveys (DOSM, 2022). This dataset encompasses details such as population size, age distribution, gender ratio, ethnic composition, and other pertinent demographic variables. By leveraging secondary data, we can gain insights into the long-term trends and dynamics of the population in the study area without expending the time and resources needed for primary data collection. This allows us to concentrate our efforts on data analysis, pattern identification, and concluding rather than allocating resources to data collection. Additionally, secondary data analysis enables us to juxtapose the population dynamics of the study area with those of other regions or periods, providing a broader context for our analysis. Furthermore, we can employ advanced statistical techniques like regression analysis, time series analysis, or spatial analysis to delve into underlying relationships and trends within the population data. Overall, secondary data analysis stands as a valuable research method that enables efficient utilization of existing data sources to gain insights into population dynamics, inform policy decisions, and contribute to our comprehension of social phenomena.

Conducting Field Surveys

A field survey constitutes a research approach aimed at collecting primary data directly from the source, typically within the natural environment where the phenomenon under investigation occurs. Its principal objective is to gather first hand information regarding a specific subject matter, encompassing environmental conditions, social behaviors, infrastructure, or any other aspect relevant to the research goals (Kean, 2016). Field surveys yield researchers invaluable insights into real-world phenomena, thereby significantly advancing knowledge across diverse domains (Cabrero et al., 2022). Researchers conducted surveys at all stations along the Kajang MRT line to observe the developments unfolding in the vicinity of these station areas. The Kajang route features a total of 29 MRT stations, including 7 underground stations. These subterranean MRT stations comprise MRT Aeon Maluri, Cochrane, Tun Razak Exchange (TRX), Pavilion Bukit Bintang, Pasar Seni, Merdeka, and Muzium Negara. The field surveys conducted at these stations aimed to evaluate the ongoing developments in their surroundings. Additionally, they aimed to identify noteworthy attractions within the MRT station vicinities capable of attracting substantial crowds, consequently leading to heightened population density compared to stations lacking such attractions. By scrutinizing these aspects, researchers sought to comprehend the factors influencing urban dynamics, including economic activities, commercial hubs, recreational venues, and cultural landmarks, which contribute to the appeal and vibrancy of specific station areas. This insight is paramount for urban planners and policymakers in their efforts to enhance the accessibility, vibrancy, and overall liveability of urban spaces surrounding MRT stations.

Discussion

The Phileo Damansara MRT station is one of the key stations in the Kuala Lumpur MRT network, located in the Phileo Damansara area known for its bustling business and corporate hub (MRT Corp, 2024). Serving as a major connectivity point for residents and workers in the surrounding area, this station plays a pivotal role in facilitating transportation. The Phileo Damansara MRT station provides easy access to major commercial centers such as The Curve, IPC Shopping Centre, One Utama, and commercial hubs around Bandar Utama and Mutiara

Damansara. The presence of this station has directly impacted the development of the surrounding area. Firstly, the increased accessibility provided by the MRT has led to a rise in the population in the vicinity of the station. According to the statistics provided, the population of the Phileo Damansara area in 2010 was 1 541 553 people, while in 2020 it increased to 1 882 112 people (BANCI, 2020; BANCI 2020). Figure 1.1 (a)(b) shows many residents, workers, and visitors opt to live or work in the areas near the Phileo Damansara MRT station due to the convenience of transportation. Development initiatives such as business centers, corporate offices, and shopping malls have emerged around the station area, contributing to the transformation of the landscape. The area around the Phileo Damansara MRT station has become a significant center for community development. Various public amenities such as playgrounds, recreational parks, and community centers have been developed to enhance the quality of life for residents and attract more people to settle in the area. Overall, the Phileo Damansara MRT station has become a catalyst for development in its surrounding area. By improving accessibility, stimulating economic development, and strengthening the local community, this MRT station has had a positive impact on the population, development, and surrounding area.



Figure 1.1(a): Around Phileo Damansara MRT Figure 1.1(b): Around Phileo Damansara MRT

The Bandar Utama MRT station plays a pivotal role as a central transportation hub in the Kuala Lumpur MRT network, situated within the dynamic township of Bandar Utama (MRT Crop, 2024). Acting as a vital connection point for residents and commuters, the station facilitates smooth and efficient travel and connectivity. Located in Bandar Utama, the MRT station offers convenient access to a wide range of amenities and attractions, thereby enhancing the development and attractiveness of the surrounding area. Primarily, the presence of the Bandar Utama MRT station has led to a rise in the local population. Figure 1.2 (a) shows many individuals and families are drawn to reside near the station due to its accessibility and connectivity to various parts of the city, resulting in the growth of residential properties and communities nearby (New Straits Times, 2017). Furthermore, the station has sparked commercial and economic growth in the vicinity. Bandar Utama is renowned for its integrated township concept, featuring shopping malls, office buildings, and recreational facilities as shown in Figure 1.2 (b). Additionally, the Bandar Utama area offers diverse attractions and recreational facilities that complement the MRT station. The presence of the 1 Utama Shopping Centre, one of Malaysia's largest malls, along with other retail complexes, dining outlets, and entertainment venues, enhances the appeal of the area, because of that the

population in that area was 176131 in 2010 (BANCI, 2010). In 2020, the population increased to 196213 (BANCI 2020). The Bandar Utama MRT station catalyzes population growth, economic development, and the fostering of a vibrant community in its vicinity. So, residents and visitors can enjoy outdoor leisure activities at parks and green spaces nearby.



Figure 1.2(a): Around Bandar Utama MRT



Figure 1.2(b): Around Bandar Utama MRT

MRT Kwasa Sentral is a key component of Kuala Lumpur's Mass Rapid Transit (MRT) system, strategically located in the burgeoning area of Kwasa Damansara. As a central transportation hub, this station plays a crucial role in facilitating connectivity for both residents and commuters in the vicinity (MRT Corp, 2024). Located in Kwasa Damansara, MRT Kwasa Sentral provides convenient access to various amenities and attractions, contributing to the overall development and appeal of the surrounding area. Firstly, the presence of MRT Kwasa Sentral has contributed to an increase in the local population. According to the statistics provided, the population of the Kwasa Sentral area in 2010 was 98084 people, while in 2020 it increased to 250000 people (BANCI, 2010; BANCI, 2020). Figure 1.3 (a)(b) shows that Kwasa Damansara is envisioned as a vibrant township with mixed-use developments, including residential, commercial, and recreational spaces. The accessibility provided by the MRT station attracts businesses, investors, and visitors, leading to the establishment of new commercial ventures and the growth of existing ones. Additionally, the focus of development in the Kwasa Damansara area revolves around creating a sustainable and livable community. The township emphasizes green spaces, pedestrian-friendly environments, and integrated urban planning to enhance the quality of life for residents (Land, 2024). In summary, MRT Kwasa Sentral catalyzes population growth, economic development, and the creation of a sustainable community in Kwasa Damansara. By offering enhanced connectivity and access to amenities, the station contributes significantly to the ongoing transformation and growth of the area.



Figure 1.3(a): Around Kwasa Sentral MRT



Figure 1.3(b): Around Kwasa Sentral MRT

Surian MRT Station: A Catalyst for Urban Development in Mutiara Damansara

Situated within the vibrant township of Petaling Jaya, Selangor, Surian MRT Station serves as a key component of Malaysia's Mass Rapid Transit (MRT) system (MRT Corp, 2024). Located along the Sungai Buloh-Kajang (SBK) Line, Surian MRT significantly enhances connectivity and accessibility for residents and commuters in the surrounding area. The presence of Surian MRT has demonstrably contributed to the development and vibrancy of Mutiara Damansara. The station offers convenient access to a variety of amenities, commercial establishments, and residential areas. This accessibility has likely played a role in the observed population increase within the vicinity. According to census data (BANCI 2010; BANCI 2020), the population grew from 167,823 in 2010 to 190,345 in 2020. Advancements in sophisticated technologies are driving a transformation in urban public transportation. These advancements are enabling the development of more efficient systems that not only benefit all sectors within a country (economically, and socially) but also contribute to environmental preservation (Man & Majid, 2024a, 2024b). This improved connectivity has a profound impact on land use patterns. It entices individuals and families to reside near stations, fostering the development of vibrant residential communities. These communities benefit from easy access to jobs, education, and entertainment options, reducing reliance on personal vehicles. This shift towards transit-oriented development (TOD) can further revitalize the surrounding area, transforming it into a thriving urban center with a mix of residential, commercial, and green spaces. The improved accessibility creates a more walkable and bikeable environment, further enhancing the overall quality of life.

Surian MRT has also stimulated commercial and economic growth in Mutiara Damansara. The station's accessibility has become a magnet for businesses, investors, and visitors, leading to the establishment and expansion of numerous commercial ventures. This has contributed to a flourishing retail landscape in the vicinity, with shopping malls, restaurants, and entertainment venues catering to a wider audience. Surian MRT exemplifies the positive impact that well-planned public transportation infrastructure can have on urban development. By enhancing connectivity and accessibility, the station has fostered population growth, residential development, and commercial activity, transforming Mutiara Damansara into a vibrant and dynamic urban locale.



Figure 1.4: Around Surian MRT

Conclusion

In summary, this study has illuminated the significant influence of MRT stations on population density in Damansara by examining 2020 census data and considering various control factors. The results provide valuable insights into the role of public transportation infrastructure in shaping urban demographics in Southeast Asia. The establishment of the MRT system has yielded tangible benefits to residents in the surrounding areas, leading to noticeable changes in population density within these districts. Additionally, the MRT system has served as a catalyst for urbanization in neighboring regions of Damansara, propelled by the escalating demand for facilities and infrastructure among Malaysia's population. To further advance research in this area, it is recommended to explore earlier census data to analyze population density changes over an extended period. Moreover, integrating data on ridership, property values, and land use changes would offer a more comprehensive understanding of the overall impact of the MRT system. Furthermore, conducting detailed station-level analyses using additional data sources or local-level studies can provide deeper insights into the underlying dynamics. This study holds the potential to offer valuable insights to fellow researchers seeking to discern the transformative effects catalyzed by the presence of the MRT system within the Damansara region. By meticulously examining the resultant shifts, particularly in population dynamics, it paves the way for a deeper understanding of the socio-economic and infrastructural changes occurring within this area. Furthermore, these findings can serve as a foundational resource for future investigations aimed at unraveling the intricate interplay between urban transportation systems and regional development dynamics. Aligned with Sustainable Development Goal 11, the transportation system emerges as a pivotal driver of sustainable urban development, contributing to the realization of the 2030 agenda for sustainable and resilient environments. Therefore, further research and policy interventions in this domain are imperative to foster inclusive and sustainable urban growth in Damansara and beyond. In advancing urban planning endeavors, it is essential to promote collaboration among city planners, transportation authorities, and local communities. This involves advocating for transit-oriented development principles to foster vibrant, mixed-use communities around MRT stations, enhancing last-mile connectivity, and integrating environmental considerations into transportation planning. Additionally, continuous data analysis and monitoring play a critical role in assessing the effectiveness of MRT expansion initiatives and shaping future decision-making processes. Reinforcing policies at the local, regional, and national levels is equally crucial to encourage the adoption of sustainable

development practices and prioritize the improvement of public transportation infrastructure. By implementing these measures, stakeholders can collectively work towards maximizing the benefits of the MRT system, supporting sustainable urban development, and enhancing the well-being of residents in the area.

Acknowledgment

This research was funded by Universiti Kebangsaan Malaysia through grant number GUP-2023-025, MRT, and Land Use: Modelling Spatial Variation in Land Development using the Geographic Weighted Regression (GWR) Approach from 2010 to 2022. We are especially grateful to our collaborators and researchers for their invaluable expertise and contributions throughout the project. Additionally, we extend our appreciation to the anonymous reviewers for their constructive feedback, which helped strengthen this study

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