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WELCOME SPEECH FROM THE CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

بسم الله الرحمن الرحيم السلام

عليكم ورحمة الله وبركاته

Greetings to all,

It is with great pleasure that I welcome you to the 17th RISM International Surveying Conference for Undergraduates (ISCU 2025), themed “*Embracing Construction Revolution 4.0: Transforming Malaysia’s Built Environment*.” On behalf of the Royal Institution of Surveyors Malaysia (RISM), I also wish to express our sincere appreciation to Universiti Teknologi MARA (UiTM), Perak Campus, for graciously hosting this significant event.

As we navigate the era of the Fourth Industrial Revolution (IR4.0)—or in our context, Construction Revolution 4.0 (CR4.0)—we are witnessing transformative advancements across the global construction sector. Technologies such as Building Information Modelling (BIM), the Internet of Things (IoT), artificial intelligence (AI), robotics, big data analytics, and cloud computing are redefining the way we build, manage, and interact with our built environment. For Malaysia, embracing CR4.0 is a strategic imperative to achieve our socio-economic and environmental goals.

This conference serves as a vital platform to unite surveying undergraduates from various disciplines, fostering critical dialogue on industry challenges, enhancing professional networking, and preparing a new generation of talent for the rapidly evolving construction landscape. It is also an opportunity for employers to engage with and inspire our future professionals.

I would like to extend my heartfelt thanks to all industry speakers, paper presenters, judges, and participants for their time, contributions, and support in making ISCU 2025 a success. I also commend the organising committee for curating a meaningful and dynamic conference experience.

May the knowledge gained, connections formed, and ideas exchanged during this event inspire all participants to lead and innovate in their future endeavours.

Wishing everyone a productive and memorable conference.

Prof. Ts Sr Dr. Adi Irfan Bin Che Ani'

Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

WELCOME SPEECH FROM CO-CHAIRMAN

RISM 17th International Surveying Conference for Undergraduates (ISCU 2025)

Bismillahirrahmanirrahim.

السلام عليكم ورحمة الله وبركاته and greetings to all.

It is my great pleasure to welcome everyone to the 17th International Surveyor Conference for Undergraduates (ISCU 2025), proudly hosted by Universiti Teknologi MARA (UiTM) Perak Branch in collaboration with the Royal Institution of Surveyors Malaysia (RISM). This event is a meaningful platform for students in the built environment to share ideas, showcase innovations, and build professional networks. We are honoured by your presence and enthusiastic participation, with 135 accepted papers and 78 poster presentations this year.

UiTM Perak, home to the College of Built Environment, has long been a hub for academic excellence in architecture, planning, and surveying. Our commitment remains strong in nurturing competent graduates who meet industry demands and contribute to nation-building.

While you're here, we invite you to experience the heritage and culture of Perak Tengah from the architectural richness of Rumah Kutai to the historical towns of Pasir Salak, Bota, and Kampung Gajah.

To all presenters and winners, congratulations on your achievements. Let your work today be a catalyst for future success and academic growth. We hope this conference will inspire you to explore new ideas, foster collaboration, and make lasting memories.

My deepest thanks to the Royal Institution of Surveyors Malaysia (RISM) and the organising committee for making this event a success.

We hope your experience here will be rewarding and unforgettable.

Thank you. Selamat datang dan selamat berjaya.

Associates Professor Dr. Nur Hisham Ibrahim, *PMP*

Co-Chairman, Universities' Partnering Committee

RISM Session 2024/2025

May 2025

WELCOME SPEECH FROM THE PROJECT DIRECTOR

RISM 17th International Surveying Conference for Undergraduates 2025

Alhamdulillah, all praise to Allah S.W.T. for His guidance and blessings in making the RISM 17th International Surveying Conference for Undergraduates (ISCU) 2025 a reality.

It is with great honour and gratitude that I welcome all participants, guests, academicians, and industry professionals to this prestigious event, proudly organized under the Royal Institution of Surveyors Malaysia (RISM). This 17th edition of ISCU stands as a proud testament to our collective dedication toward academic excellence, professional collaboration, and youth empowerment in the field of surveying.

I extend my heartfelt appreciation to RISM for its unwavering support, to the hardworking ISCU 2025 Organising Committee, and to all 16 partnering universities across Malaysia for their commitment and contributions. Your efforts have shaped this conference into a dynamic platform for knowledge exchange, innovation, and professional growth.

To the academicians and practitioners present, your insights are invaluable in bridging the gap between academic theory and real-world practice. To our undergraduate participants, your passion, curiosity, and commitment are the very foundation of our future. May this conference not only deepen your academic journey but also ignite a spirit of leadership, integrity, and sustainable thinking.

Let this gathering serve as more than an academic milestone. May it foster lifelong networks, inspire transformative ideas, and chart new directions in our shared professional journey.

Wishing everyone a rewarding and inspiring conference experience.

Sr Dr. Nurul Fadzila Zahari

Project Director

RISM 17th ISCU 2025

THE EFFECTS OF MASS RAPID TRANSIT (MRT) TOWARDS THE DEVELOPMENT OF PUTRAJAYA

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ABSTRACT

Putrajaya is located in Klang Valley in peninsular Malaysia, twenty-five kilometers south of Kuala Lumpur. It is also part of the Multimedia Super Corridor (MSC), which runs approximately fifty kilometers connecting Kuala Lumpur to Kuala Lumpur International Airport (KLIA). The total population of Putrajaya is around 109,202 residents and continues to grow over time. This population increase has led to increased demand for commuting or traveling, especially in the city center during peak hours. Public rail infrastructure such as Mass Rapid Transit (MRT) was provided around the Klang Valley area, which will be vital in addressing this congestion. MRT helps minimise congestion, enhance quality of life by lowering pollution, and reduce carbon emissions from private vehicles. This study aims to explore the effects of MRT and factors that influence MRT development in Putrajaya by using content analysis methods to analyze data, which is gathered from literature and previous studies. The initial findings of the effects of MRT find that the MRT has increased property value and development projects, improved accessibility and connectivity, enhanced urban planning and infrastructure, encouraged smart city initiatives, and expanded retail and entertainment hubs in Putrajaya. The MRT development is strongly influenced by traffic congestion, environmental sustainability, urban population growth and development, land use planning, and Transit-Oriented (TOD) strategies. This study is crucial in understanding the effect of MRT on the development in Putrajaya.

Keywords: Mass Rapid Transit (MRT), Putrajaya, Transportation

I. INTRODUCTION

In the modern era, the country's transport system functions as a valuable asset to support the productivity of the economy of the whole nation. Rail, water, air, and land are four means of mobility that create the transportation network (Kumarran et al., 2023). In 1903, Malaysia established its land transport system as a starting point to create its socioeconomic infrastructure. The primary mode of transportation was developed up to link with larger towns where the rubber and metal mines were located (Ghapar Othman & Hj Ali, 2020). As transport networks have grown, Malaysia's railway network has expanded, with steam-powered trains providing means of electrical trains (KTMB). Furthermore, the governments of Singapore and Malaysia are now working together on the enormous East Coast Railway Link (ECRL) operation, which is expected to be completed in 2027 and will link the two countries by land. Transportation in Peninsular Malaysia has significantly improved as the region has one of Asia's greatest road networks (Ghapar Othman & Hj Ali, 2020; Kamarudin, 2017). Malaysian rail transport choices include light rapid transit (LRT), monorails, airport rail links, and Mass Rapid Transit (MRT).

The current largest infrastructure project development in Malaysia is the MRT3 Circle Line, it is in the planning stages of development, and Dato' Sri Najib Tun Razak, the Former Prime Minister of Malaysia stated that he is assured it will start operating by 2027 (Shen-Li et al., 2022). The first line of MRT was the MRT Kajang Line (Bhatt, 2020). Next, the second MRT was the MRT Putrajaya line (Kee Keat et al., 2023). This country has invested a significant amount of money in expanding public transportation, especially in rail transit (Hamzah et al., 2023).

Then, for a sustainable city to be created, Transport Orientated Development (TOD) must be implemented to meet the Sustainable Development Goals (SDGs) by 2030 (Iqbal Raj & Julker Naem, 2022). TOD refers to the utilisation of a mixed-use, high-density land development pattern, such as residential and commercial land, close to public transportation stations and highways (Hsu, 2020). This suggests that a good investment in public transport advancements will benefit everyone, not just the MRT users (Zhang, 2023). After considering these benefits, it can be said that the empirical study generally supports the idea that investing in urban rail transit has a significant impact on development. This research tries to analyse the effects of MRT, more **specifically** on the development in Putrajaya.

II. BACKGROUND OF MASS RAPID TRANSIT (MRT)

Gamuda Berhad (2020) stated that, it is unimaginable that the train system was introduced and established in June 1885, more than 135 years ago, its primary use was to transport tin from Taiping, Perak to Port Weld (Kuala Sepetang) with a travel length of 13 kilometers only. After that, it is currently managed by the Malayan Railway, known as Keretapi Tanah Melayu Berhad (KTMB). The rail line was expanded further to Kuala Lumpur and Port Swettenham (Port Klang) in 1886, and a second line was developed in 1891 that links Seremban, Teluk Anson, and Port Dickson to Tapah Road. Then, the Federated Malay States Railway was established in 1896 (Syamsunur et al., 2024). Therefore, other lines were also constructed, such as the East Coast Line, which connected Gemas and Bahau, and the West Coast Line, which linked Penang and Johor. Originally, the KTM rail lines were powered by traditional steam technology. Then, in 1957, it was upgraded to diesel-powered trains to improve its efficiency. In 1995, KTMB began to use electric commuters, which enhanced its productivity and more efficient between Seremban, Negeri Sembilan, and Klang, Selangor (Sahrul et al. 2020).

After that, in 1996, the first light rail transit (LRT) was introduced to move people within the Klang Valley quickly, which is known as *Sistem Aliran Transit Ringan* or Star LRT which has 25 stations that linked about 17 kilometers from Sentul Timur, Ampang and Sri Petaling (Kumarran et al., 2023). To strengthen the Star LRT, a second light rail system was created under *Projek Usahawan Transit Ringan Automatik Sdn Bhd (Putra)*, completed and started operating in 1999, spanning from Gombak to Kelana Jaya (Prasarana Malaysia Berhad, 2024). In 2002, these LRT services were taken over by *Prasarana* and operated by the rail company, known as Rapid Rail Sdn Bhd. Along the way, Putra LRT has been changed to LRT Kelana Jaya Line, while Star LRT is now the LRT Ampang Line and LRT Sri Petaling Line. The Sri Petaling line was expanded to Subang Jaya and the Kelana Jaya line was extended to Puchong. These lines spread about 46.4 kilometers in 2016. Moreover, Rapid Rail also owns and operates a monorail system that consists of 11 stations that run through the center of Kuala Lumpur (Gamuda Berhad, 2020).

Later, the Mass Rapid Transit was established to meet the demand for a rail transportation system (Sahrul et al., 2020). He also stated that it was the first *Prasana* operating system using Rapid Rail was the MRT Kajang Line, connecting Sungai Buloh and Kajang. It was built on July 8, 2011, and was fully completed and operated in July 2017. The MRT Kajang Line was 47 kilometers long, with 9.5 kilometers of underground rail consisting of 7 underground stations. Then, in June 2010, Former Prime Minister Dato Seri Najib announced that the second MRT project in Malaysia was the MRT Putrajaya Line, which gained full approval from the government in 2014 (Kee Keat et al., 2023). To collect public opinions and concerns, a public inspection was conducted from May to August 2015, referring to Section 84 of the Land Public Transport Act 2010 (Gamuda Berhad, 2020). Next, in October 2015, final clearance was granted by the government for the Putrajaya Line Railway Requirement, which allowed the land acquisition procedures to proceed onward. According to Prasarana Malaysia Berhad (2024), in September 2016, the official grand opening ceremony for the Putrajaya Line was conducted at the Putrajaya Sentral MRT Station, which was led by Former Prime Minister Dato Seri Najib. The development process involved two development stages, the first phase connected Kwasa Damansara and Kampung Batu, which began service in July 2021. It was launched by the late Prime Minister Dato' Sri Ismail Sabri Yaakob. The second phase is the MRT Putrajaya Line, which was officially launched by Prime Minister YAB Dato' Seri Anwar Ibrahim, expanding 40.2 kilometers from Kampung Batu to Putrajaya Sentral, and was completed in March 2023 (Syamsunur et al., 2024). Then, it was fully operating on March 2023 and runs 57.7 kilometers from Sungai Buloh to Serdang, ending in Putrajaya. It consists of 10 underground stations featuring 13.5 kilometers (Prasarana Malaysia Berhad, 2024a). The Malaysian Mass Rapid Transit Corporation Sdn. Bhd. (2023) estimates that in 2020, the Klang Valley's daily travel demand will reach 18 million trips (Gamuda Berhad, 2020).

The current transport infrastructure in cities around the world has been severely impacted by urbanisation and

population growth (Perl et al., 2021). The frequency of travel to and from the city center rises as city limits expand and more residents move to the suburbs. As a result, the number of individual cars on the road has risen a lot as a consequence of these situations, which has been proven in traffic congestion, air pollution, energy consumption, and accidents (Fageda, 2021; Ratnawati, 2021). However, mass transit is the one form of transportation that can ensure the long-term sustainable development of the country as cities continue to grow because of its large capacity, and extended geographical distance (Murti et al., 2023). From Kwasa Damansara, which was the newest city built in northwest Kuala Lumpur, to Putrajaya, Malaysia's federal administrative center, it is expected to expand to almost two million people (Ramlan et al., 2021b). In addition to providing economic productivity and efficiency in the region that is far from the city center, rail infrastructure helps to commute the suburban residents from one place to another within the city center, so the need for better connectivity has resulted in the development of MRT in Putrajaya (Othman et al., 2023). Therefore, the Malaysian government recommended and encouraged the residents to transform from private vehicles to public transport, such as the MRT, to help reduce carbon emissions and traffic congestion in the city (Prasarana Malaysia Berhad, 2024b).

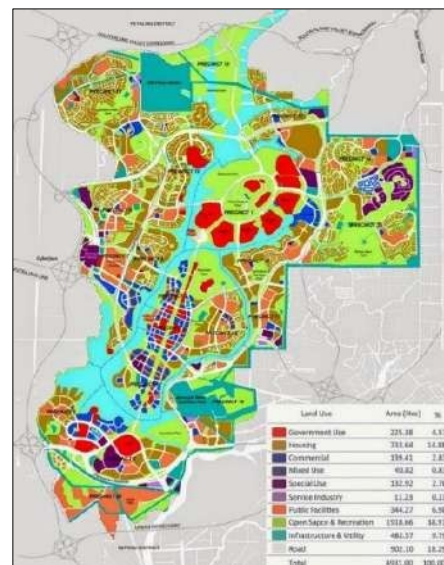


Figure 1.0 Putrajaya's Master Plan
Source: Putrajaya Structure Plan 2025

The goals of Putrajaya are efficient urban life, sustainability, and environmental integration (Jebasingam et al., 2004). This city's growth is shaped by Putrajaya's Master Plan as shown in Figure 1.0, featuring some of the important elements needed to establish an environmentally friendly city that can adapt to both administrative and resident needs (Othman et al., 2023). Then, to provide effective connectivity between the suburbs and the city, the construction of park-and-ride facilities on the city's outskirts is being undertaken within the MRT lines, which also helps to promote the use of public transport and lessen traffic congestion (Siang et al., 2023).

III. METHODOLOGY

This study is conducted in stages and with a structured plan to get more valid study data. Firstly, identify the issues that have arisen recently with MRT development, then data were gather from secondary sources such as articles, journals, and websites. The data is emphasize more towards Malaysian rail transport system especially on MRT project. Secondly, the data is then analyzed through contents analysis in academic journals from Science Direct, Google Scholar Research Gate that discuss on the rail infrastructure, MRT and its contribution in the country. To ensure a reliability of this research, a total of 32 journals and articles related to MRT development were reviewed as a part of this study, such as Journal of Urban Management, Journal of Transport Geography, and Journal of the Malaysia Institute of Planners. Therefore, the data also analyzed from the publication of MRT Corporation related to future development and its expansion strategies. This study only depends on the secondary data, which limits the collection of real data, such as giving direct survey to the respondents.

IV. FINDING AND DISCUSSION

A. *Factors Influencing the Development of Mass Rapid Transit (MRT)*

Due to rapid urbanisation, road congestion in cities continues to rise as the number of people living there increases and the demand for housing also increases (Sim, 2024). The amount of traffic in the city and on highways has increased due to many residents rely on private vehicles, thus, government and local transportation planners have started thinking about additional approaches that can slow or stop the expansion of traffic which is the development of rail transit seems as an important public transportation that can mitigate the traffic congestion (Hamidun et al., 2023).

According to Milewicz et al. (2023), expanding the railway network is one of the goals to increase energy efficiency and lower pollution. Carbon-free transportation can be achieved with electric trains that run on renewable energy. Rail transit development aims to reduce the environmental impact of rail infrastructure, including MRT, LRT, KTM, and Monorail. This includes lowering emissions of greenhouse gases, pollution in the air, and sound pollution from private automobiles (Craven et al., 2020). Therefore, today, the rise in urban population growth also influences the development of MRT. The focus is on making changes in the existing facilities and increasing easy access mobility for the residents (He et al., 2024).

Then, many research studies have shown that the Klang Valley in Malaysia has experienced significant shifts in land use patterns as a result of the development of MRT systems. Transformation of land use is the process by which an undeveloped area becomes an urban region over time. These changes influence population growth, increase in job opportunities, and enhance urban planning (Man et al., 2024). Furthermore, MRT development is also influenced by the Transit Oriented Development (TOD) Strategies, which create better connectivity via walkable distance to public transportation (Ramlan et al., 2021).

B. *Effects of Mass Rapid Transit on Development*

MRT has significantly impacted the whole development of Putrajaya, such as the increase in property value due to being close to rail stations (Faris Dziauddin et al., 2022). Since it saves money and time on traveling, some people are willing to pay for a higher property price that has closer access to public transport stations (Zhang, 2023). Therefore Sim (2024), also stated that the active strata residential, which is less than 1.5 kilometers from the MRT station, always has higher prices per square foot compared to those that are farther away.

According to Kee Keat et al. (2023), the development of MRT also increases in development projects, where the rail line expansion helps the citizens to have more access within the city, which is essential in boosting the socioeconomic growth and the city's reputation. The significant influence of MRT developments on urban planning patterns is proven by many researchers, which recorded increases in property values, changes to the mixed-use land development, and the construction of new residential and commercial buildings surrounding the MRT stations (Murti et al., 2023). It has been shown that MRT projects serve as drivers for urban redevelopment and local real estate growth, which also act as a means to reduce traffic congestion (Abd Majid et al., 2024).

The way MRT systems alter urban landscapes and encourage environmentally friendly growth patterns can be seen by transforming vacant land into functioning transit-oriented communities (Bhatt, 2020).

Moreover, easy access and connection provided by the link to each city for a particular trip are the reasons for selecting public transport (Chen et al., 2022). Accessibility refers to how close one's destinations are when traveling by public transportation (Syamsunur et al., 2024). Then, a public transport system's connectivity is determined by its duration, speed, journey, and the number of exchanges required for a specific origin-destination connection (Anjum et al., 2024). These are very important since the MRT connectivity and accessibility are the main reasons influencing passengers' decisions to use the services (Bhatt, 2020).

MRT development also enhances urban planning and infrastructure, in which the trend towards environmentally friendly urban development is encouraged by effective transportation (Morris et al., 2015). He also stated that this change reflects on the urban transportation design. In addition to completely changing the way people travel around cities, MRT has also changed the way land is used and solved problems associated with the rapid processes of urbanisation, like traffic jams and environmental pollution in terms of air and sound (Man et al., 2024). Significant changes in the dynamics of urban development are brought about by the installation of MRT systems.

MRT systems are important to encourage smart city efforts since they combine sustainability, urban growth, and technology effortlessly. MRT systems are an example of effective public transport, which is a crucial component of smart cities. MRT systems drastically cut down on travel times, air pollution, and traffic congestion by promoting the switch from private cars to public transportation (Inam, 2024).

MRT also leads to the expansion of the retail and entertainment hubs, which helps to stimulate economic growth (Syamsunur et al., 2024). For example, there is typically more foot traffic in the vicinity of MRT stations, which encourages the expansion of retail centers, and entertainment facilities. Economic development is promoted by this atmosphere, which draws investments and creates job possibilities.

Table 1.0 Relationship Between Factors and Effect of Mass Rapid Transit (MRT) Development

Factors Influencing the Development of Mass Rapid Transit (MRT)	Effects of Mass Rapid Transit (MRT) Towards the Development	Relationship
Urbanisation	Higher property prices near the MRT	Increase population resulting in the rise in housing demand, thus, it increases the property prices, especially near the MRT stations
Traffic congestion	Increase in development projects	Traffic jams from reliance on private vehicles led to the MRT development, which helps to reduce the congestion
Land use changes	Improve accessibility and connectivity	MRT encourages land use changes, transforming from vacant to urban regions that offer easy access and connectivity for residents
Environmentally friendly goals	Enhance urban planning and infrastructure	MRT helps in reducing noise and air pollution, which results in promoting efficient infrastructure and better urban design
Transit-oriented development (TOD) strategies	Smart city initiatives	TOD offers a walking distance access to the public transport and within the city, which integrates with smart city initiatives

Sources: Author's (2025)

Table 1.0 shows the relationship between the factors influencing the development of MRT and the effects of MRT towards the development.

CONCLUSION

In conclusion, this research provides some academic insights into the current state of development in Putrajaya after the establishment of MRT and the factors that influence its development. This study finds that the MRT significantly impacts development which proves that the property value near the MRT station is higher in price per square foot compared to those that are farther away. It also results in an increase in development projects especially in the area that is near the railways and public transport stations. The undeveloped land is slowly being constructed with commercial and residential property as the existence of MRT contributes to changes in land use. MRT was established in Putrajaya to enhance the connectivity and accessibility of Klang Valley, which helps to link and provide easy access to travel to the residents in this city. Besides, the TOD strategies also influence the development of MRT in Putrajaya as it is a part of the urban planning requirement to increase urban productivity and efficiency. These findings offer valuable insight and guidance for policy makers and urban planners, suggesting that MRT can be strategically developed with the goals of improving accessibility and maximizing land value. The study will also help future research to investigate more impacts of MRT on the development of the city. By examining the relationship between the factors influencing the MRT development and the effects of the development, it provides a piece of comparative information that is different in each city.

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