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ISCU 2025

17TH RISM INTERNATIONAL SURVEYING CONFERENCE FOR UNDERGRADUATES

Embracing Construction Revolution 4.0 (CR4.0): Transforming Malaysia's Built Environment

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WELCOME SPEECH FROM THE CHAIRMAN

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

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ السَّلَام

عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

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 ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING TENANT EXPERIENCE: CASE STUDY SUNWAY PYRAMID MALL

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ABSTRACT

The integration of Artificial Intelligence (AI) in real estate sector is transforming tenant experiences and optimizing property performance and driving economic sustainability. AI-driven solutions such as predictive analytics, tenant behavior modeling and automated lease management enhance operational efficiency, personalize tenant interactions and improve tenant satisfaction and retention. However, despite its benefits Artificial Intelligence adoption in the retail property sector remains limited due to financial constraints, technological resistance and reliance on traditional management approaches. This study examines the role of Artificial Intelligence in enhancing tenant experience at Sunway Pyramid Mall, Malaysia, while exploring key challenges and opportunities associated with its implementation. The research evaluates how AI contributes to sustainable asset management, streamlines operations, and impacts overall mall performance. Findings from this study are expected to highlight Artificial Intelligence's potential in increasing property value, improving management strategies, and ensuring long term competitiveness in the commercial real estate sector. These insights will provide valuable guidance for mall operators, investors, and policymakers seeking to integrate AI driven technologies into asset management, ultimately fostering a more adaptive and tenant centric retail environment.

Keywords: Artificial Intelligence, Tenant Experience, Digital Transformation

I. INTRODUCTION

The real estate industry which the retail sector has experienced radical transformation due to rapid technological progress. Digitalization growth has introduced more solutions and equipment that make it easy to manage properties, streamline procedures, and enhance the tenant experience. Shopping malls are no longer bricks and mortar stores; they are dynamic with high technology systems with infused throughout to propel maximum customer satisfaction, operating performance, and sustainable growth. Of these technologies, Artificial Intelligence (AI) has been the most promising development because it allows property managers to make data driven decisions, automate tasks, and create personalized tenant experiences.

Artificial intelligence has the potential to revolutionize retail property management along many fronts. With predictive analytics, Artificial Intelligence enables mall managers to analyze consumers consumption behavior patterns, foretell demand, and tailor offerings according to shifting market patterns. Additionally, Artificial intelligence driven automation maximizes facility management by maximizing energy consumption, enhancing monitoring in security, and enabling predictive maintenance, hence reducing operational costs and increasing efficiency. Besides, AI driven chatbots and virtual assistants are increasingly being harnessed to enhance customer service efficiency through instant provision of question answers, issues resolution, and personalized shopping recommendations.

Though all these advantages have been present, AI application within Malaysia's retail real estate market remains somewhat hampered by various challenges. Pricy implementation is a leading deterrent since adoption of AI

powered solutions comes at the cost of significant investment in technology infrastructure, data analytics platform, and employees' training. Additionally, the lack of AI property management knowledge and expertise also prevents widespread adoption. The majority of retail property stakeholders are still adhering to conventional management practices, which are proving to be resistant and critical of the investment return on AI technology.

With rising competition within the retail industry, shopping malls have to catch up with changing consumer expectations through the adoption of AI based solutions. AI can be the key to making shopping experiences personal through personalized promotions, intelligent recommendation systems, and dynamic pricing programs based on real time demand fluctuations. AI also optimizes the use of space by optimizing tenant mix and allowing data driven decisions on lease management to ensure mall operators achieve the highest occupancy levels as well as rental returns. In addition to such business benefits, AI integration has the potential to contribute significantly towards sustainability by optimizing energy wastage, promoting sustainable building management, and enhancing general environmental efficiency.

Given the growing importance of AI in shaping the future of retail real estate management, the present study will seek to examine its potential towards enhancing tenant experiences at Sunway Pyramid Mall, Malaysia. In particular, the study will endeavor to achieve the following objectives:

- a. To assess how AI enhances tenant experiences through personalized services and smart technology applications.
- b. To evaluate the impact of AI driven automation on operational efficiency and sustainability in retail property management.
- c. To identify the key challenges hindering AI adoption in the retail real estate sector and propose strategies for overcoming them.

By addressing these objectives, this research will provide a comprehensive understanding of AI's transformative role in retail property management. The findings will give valuable information to mall operators, investors, and policymakers who would like to integrate AI driven innovations into their asset management strategies. The study will also explore potential solutions for closing the gap between traditional property management practices and cutting edge AI driven practices and transform shopping malls to become competitive, responsive, and tenant centric in the digital era..

II. LITERATURE REVIEW

Enhancing Tenant Experience Through Smart Technology

Tenant satisfaction is among the key drivers of retail property performance and has a direct effect on long term profitability via occupancy rates. Artificial Intelligence driven technologies have revolutionized how shopping malls interact with tenants and shoppers through simple, personalized conversations. Predictive analytics enables mall owners to quantify consumer behavior and tailor promotions, thereby increasing customer engagement and tenant revenue. For instance, AI can look at past shopping habits to come up with custom offers, producing a compelling retail experience (Wang et al., 2020).

In addition to predictive analytics, smart facilities management enhances the experience of the tenants through smart systems that adjust lighting, temperature, and security in real time based on foot traffic as well as individual preferences. They not only enhance comfort, they also reduce the use of energy, minimizing operational costs and promoting sustainability (Zhang & Chen, 2021). Advanced AI driven security functionalities also contribute towards an enhanced shopping experience, as facial recognition and real-time surveillance analytics aid in the identification of suspicious activity, ensuring the environment is safer for shoppers as well as tenants. Furthermore, AI driven digital wayfinding solutions optimize navigation in malls, reducing frustration and increasing customer convenience. Another notable AI powered technology is automated customer service, whereby chatbots and virtual assistants provide immediate responses to queries, reducing waiting times and enhancing customer satisfaction (Patel & Gupta, 2022). Through the integration of such AI powered technologies, mall owners can create a tenant friendly environment that optimizes the overall shopping experience and develops long term tenants.

Artificial intelligent's Role in Improving Operational Efficiency

Besides enhancing the lives of tenants, AI significantly improves the operational efficiency of shopping malls. Lease management, security, maintenance, and energy efficiency are sophisticated functions in retail property management. AI based systems make these processes easier by automating lease management, enabling timely renewals, and maintaining contractual compliance (Smith & Brown, 2019). Artificial intelligence driven insights allow landlords and property managers to anticipate potential lease disputes and develop proactive outreach strategies to prevent tenant issues from arising, improving landlord tenant relations and reducing vacancy rates.

Moreover, AI allows for tenant behavior analysis through monitoring of movement patterns and shopping patterns, which allows property managers to optimize the utilization of retail space and improve mall designs (Lee et al., 2020). Heat maps created using AI provide valuable insights on areas with high activity, which allows mall operators to allocate top retail space to tenants that have the most customer interaction. AI based demand forecasting also helps in inventory management so that retailers can have the right amount of stock based on current consumer demand, thus avoiding wastage and enhancing profitability.

Energy management is also a critical field where efficiency is assisted by AI. AI building management systems keep tabs on current energy demand and perform automatic adjustments to power intake to cut waste and costs. Smart energy optimization has been discovered to significantly cut operating costs while contributing to environmental sustainability (Gopalakrishnan et al., 2021). AI powered climate control systems also enhance efficiency even more by dynamically managing heating, ventilation, and air conditioning (HVAC) parameters based on occupancy and weather. By leveraging AI in these fundamental areas, mall operators can reduce manual labor, reduce expenses, and offer a more efficient and cost-effective shopping space.

Sustainable Asset Management in Retail Properties

Sustainability has become a critical concern for the real estate industry, with increasing pressure on property managers to implement environmentally friendly practices. AI plays a pivotal role in advancing sustainability efforts in retail properties through smart energy management, predictive maintenance, and waste reduction. AI driven energy optimization systems monitor consumption patterns and adjust power usage accordingly, reducing costs and minimizing environmental impact (Huang & Li, 2022).

Furthermore, predictive maintenance technologies utilize AI algorithms to detect potential equipment failures before they occur, enabling proactive repairs and extending the lifespan of infrastructure (Chakraborty et al., 2020). AI-powered waste management solutions also contribute to sustainability by analyzing waste generation patterns and suggesting efficient recycling and disposal strategies (Fernandez & Lopez, 2021). These AI-driven sustainability initiatives not only enhance property value but also align with global environmental goals, making shopping malls more attractive to eco-conscious tenants and customers. Additionally, AI-enabled water conservation systems monitor and optimize water usage within the mall, preventing wastage and promoting responsible consumption. By incorporating AI-driven sustainability strategies, retail property managers can future-proof their assets while reducing environmental impact and operational costs.

III. CHALLENGES TO AI ADOPTION IN RETAIL PROPERTY MANAGEMENT

The use of Artificial Intelligence (AI) in retail property operations is a paradigm shift that has vast advantages regarding enhancing tenant satisfaction, optimizing operational effectiveness, and increasing sustainability. AI-driven technologies such as predictive analytics, automated facility management, and smart customer interactions empower shopping malls to improve tenant satisfaction and streamline business processes. However, with so much potential, its adoption in the retail real estate sector is still slow due to financial, organizational, and regulatory barriers. The following discusses both the benefit and drawback of AI integration, highlighting its impact on tenant engagement, energy management, lease administration, and the structural constraints holding it back from mass adoption.

Artificial intelligent Driven Personalized Tenant Interactions

One of the most significant applications of AI in retail property management is the way it can customize tenant engagement by providing personalized experiences. AI-powered recommendation engines, consumer behavior

analytics, and automated marketing campaigns enable mall operators to create highly customized shopping environments. Using predictive analytics, AI can track individual purchasing habits and suggest suitable promotions, increasing customer engagement and tenant revenue (Wang et al., 2020). Virtual assistants and chatbots based on AI continue to promote customer service in terms of the delivery of real time responses to queries, good complaint handling and personalized shopping recommendations (Patel & Gupta, 2022).

However, as useful as such AI applications are for the overall consumer shopping experience, data privacy remains a significant hurdle. AI software must be built with huge caches of consumer and tenant data so that they can make reliable forecasts and suggestions. Ensuring consistency with privacy acts such as Malaysia's Personal Data Protection Act (PDPA) is critical so that data are not accessed inappropriately and misused (Kim & Park, 2022). Besides, resistance from customers and tenants who are wary of data collection activities will also discourage the application of AI.

AI in Smart Energy and Sustainability Management

Intelligent energy management through AI has been a vital solution to managing operational costs and improving sustainability for retail real estate. AI-powered building management systems track existing energy consumption in real time, adjusting lighting, heating, and cooling facilities based on demand and occupancy patterns (Zhang & Chen, 2021). With such a level of automation, shopping malls can optimize the utilization of power, minimize waste, and lower utility bills significantly. AI-based predictive maintenance also helps in identifying potential equipment breakdowns in advance, which makes early repair possible and minimizes downtime (Chakraborty et al., 2020).

Despite these advantages, financial constraints are the biggest hurdle to the application of AI in intelligent energy management. The exorbitant cost of installing AI enabled infrastructure such as smart sensors, automated HVAC systems, and energy optimization software deters most mall owners from investing in such systems (Jones et al., 2019). Small property owners of retail, in turn, find it difficult to make budget allocations towards AI solution-based propositions, which limits their options for leveraging long term cost benefits and energy efficiency opportunities.

Artificial intelligent Driven Lease and Property Management

The second domain where AI is transforming retail property management is automated lease administration. Manual contract management, rent collection, and compliance tracking are time-consuming and labor-intensive in conventional lease management practices. Property management software based on AI makes such tasks effective by performing the lease renewal process automatically, generating real-time financial reports, and upholding regulatory compliance (Smith & Brown, 2019). The automation reduces administrative burdens, ensures maximum transparency, and boosts operational efficiency for mall managers.

One of the primary challenges in adopting AI-driven lease management is the extensive adoption of conventional management practices in the retail property sector. Most property managers are biased towards conventional, paper based leases and manual management, thus resistance to adopting AI (Wilson & Thompson, 2020). Moreover, the lack of technical expertise and digital literacy among property management teams is another obstacle in the adoption of AI enabled solutions. Without the right training and attitude adjustment, mall operators will not be able to realize the full potential of AI in lease administration.

Organizational and Regulatory Barriers to AI Adoption

While AI offers multiple operational benefits, its implementation is typically followed by organizational resistance and regulatory challenges. Property managers and tenants are likely to resist the application of AI since they might be reluctant to abandon traditional practices to adopt technology-driven solutions (Miller & Davis, 2021). Staff in the retail property sector may consider AI as a tool for job replacement, thus resist automation initiatives. Similarly, lessees would probably resist embracing AI fueled change in mall operations, fearing to disrupt existing business paradigms.

Regulatory wise, ethical concerns and industry compliance also pose additional challenges. AI systems must be operated in a transparent and fair way so that tenant management decisions, rent rates, and customer interaction decisions do not end up in discrimination or prejudice. Immoral applications of AI such as algorithmic bias in determining rent prices or discriminatory tenant screening practices may invoke legal proceedings and damage to

the firm's reputation (Huang & Li, 2022). Regulatory bodies must formulate clear-cut rules for AI management in real estate for its responsible and equitable deployment.

The Future of AI in Retail Property Management

Despite these challenges, the prospects for AI in retail property management remain rosy. As technology becomes more affordable and ubiquitous, mall operators will increasingly realize how AI can help improve profitability, tenant retention, and sustainability. Overcoming current barriers include :

- Financial Incentives: Government support, grants, and subsidies for AI driven smart building technologies can help offset high implementation costs.
- Training Programs : Investing in AI literacy and digital skills training for property managers and staff can facilitate smoother adoption and reduce resistance to change.
- Enhanced Data Security Measures: Implementing robust cybersecurity protocols and compliance frameworks will help address data privacy concerns and build trust among tenants.
- Collaboration with Tech Firms: Partnering with AI technology providers can provide retail property managers with access to cutting edge solutions, reducing the burden of in house AI development.

Ultimately, AI's role in retail property management extends beyond operational efficiency it is a key driver of competitiveness, sustainability, and tenant engagement in an increasingly digital landscape. As industry stakeholders work towards overcoming financial, technological, and regulatory barriers, AI adoption is expected to accelerate, paving the way for a more adaptive, intelligent, and tenant centric shopping environment.

CONCLUSION

The rapid digital transformation of the real estate industry particularly in the retail sector has underscored the growing importance of Artificial Intelligence (AI) in enhancing tenant experience, optimizing operational efficiency, and delivering sustainable asset management. Malls such as Sunway Pyramid Mall are not just commercial assets anymore but vibrant destinations where AI driven solutions are pivotal to facilitating customer engagement and business performance. From predictive analytics and smart facility management to AI powered customer service, AI has been a powerful tool in creating a tenant centric retail ecosystem.

Literature review showed that how AI is enhancing tenant experience in the form of personalized recommendations and maximizing mall operations through automation of lease administration and propelling sustainability through smart energy management. These developments have led to increased tenant satisfaction, reduced operational costs and enhanced space usage. However, despite all these advantages deployment of AI in retail property management remains in infancy stages due to significant challenges such as financial constraints, resistance to change, data security concerns and regulatory challenges.

The discussion pointed out that despite the extensive benefits of AI fueled innovations, their uptake is predominantly hindered by high costs, lack of expert skills and resistance of property managers to shifting from traditional methods of asset management. Additionally, data protection problems and ethical AI usage also make it difficult for adoption to occur. The intervention into these challenges requires strategic responses in the nature of financial offers, enhanced digital literacy training, greater cybersecurity, and collaboration arrangements between mall managers and AI technology providers.

In the coming times, the use of AI in retail property management is expected to increase as more technology development makes the solutions more affordable and widely available. Embracing AI based innovations, shopping malls can remain competitive in a growing digitalized business landscape while developing a more responsive and efficient and tenant centered environment. As the retail real estate sector evolves, stakeholders including mall operators, investors, and policymakers must actively explore AI's potential, ensuring its responsible and strategic deployment for long term industry sustainability.

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