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Carbon Credit & Sustainable Development Goals (SDGs)

EDITORIAL

Selamat Datang To All Our Readers,

Welcome to our latest issue of The Malaysian Surveyor. Our theme for this issue is on Carbon Credit and the Environmental Sustainable Goals (ESG). We are glad that we have managed to get articles pertaining to this issue from a few perspectives. The United Nation (UN) declaration for Transforming the World with the 2030 Agenda for sustainable development have reached its halfway mark and its about time that the industry especially we the surveyors start looking at the SDG for our profession. At present no benchmarking or standards have been issued by UN or the government on the implementation of SDG other than the carbon credit calculation which in Malaysia is still at its infancy stage, hopefully these articles would start create some interest about these matters to our members.

In this issue, we are pleased to share our interview with the current President on his views about his experience his outlook to the industry as well the green issues impacting the industry.

Also, we have a book review on a book written by our PP Sr Khoo Boo Kean who has written his memoir about his life experience throughout the years. *"…. written in simple language and when reading it is as if Sr Khoo is just beside you narrating it himself"* as commented by our PP Sr Kwan Hock Hai who did this review.

We are also quite fortunate that our institution has managed to carry out a few international events successfully and we applaud the organising team who have put our Institution in the international limelight and we are glad to include this prestigious events in this issue.

Again, we wish to call members to share their views about the profession, news about members and any suggestions to improve our magazine.

Last but not least, we would like to take this opportunity to wish all our readers.

Happy Diwali

Sr Hj. Ahmad Suhaimi Abdul Majid

CQS, FRISM, FRICS, MIVMM

Est. 1961

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FRISM, FMIPFM, MRICS, MPEPS

INTERVIEW WITH THE PRESIDENT OF RISM SESSION 2023/2024

You've worked in roles ranging from valuation to property management to advisory services. How has your diverse experience contributed to your ability to lead in your current position?

The various roles that I have played during my different areaa of work helped me to gain wide ranging experience and management skills. This has helped to shape my character and hone my leadership skills to be able to take up more responsibilities.

As the President of the Royal Institution of Surveyors Malaysia (RISM), you've played a pivotal role in guiding the organization. Can you share your vision for advancing the surveying profession during your tenure and the strategies you've employed to achieve this vision?

My vision is to ensure RISM remains relevant in the eyes of the members under the different disciplines and the public. The strategy is to firstly ensure that the secretariat is in line with this vision which led to the restructuring of the organisation in the first 3 months of coming into office and the streamlining of services to meet members' needs.

RISM often engages with government bodies to influence policy decisions. Can you discuss a particular advocacy effort or collaboration that you led or planned to promote the interests of surveyors and positively impact the construction sectors in Malaysia?

RISM represents the voice of more than 12,000 members. The past 3 months have seen the organisation having engagements at different levels with various government ministries and agencies on matters such as Budget 2024, 12th Malaysian Plan, etc. The participation in major consultative work with the Public Works Department, Valuation and Property Services Department, Construction Industry and Development Board (CIDB), Survey and Mapping Department and other agencies have placed RISM as an important stakeholder in the Government's eyes.

Your roles involve managing diverse responsibilities. How do you maintain a balance between your commitments as an industry leader, educator, and consultant while still finding time for personal growth and well-being?

I have been fortunate to serve as president and as committee member of other associations in the past, various committees under various Government agencies, served as Board and Exco member of Board of Valuers, Appraisers, Estate Agents and Property Managers for several years, still serving a member of Board of Governors for INSPEN (National Valuation Institute) as well as running my own firm all at the same time.

> **"I have been able to strike a balance all this while so becoming the President of RISM actually helps me to manage my personal growth and well being."**

When your term as RISM President concludes, what specific achievements and changes do you hope to leave behind as a testament to your leadership and dedication to the profession?

Every leader looks towards leaving a legacy to be benefitted and continued by their successor. My own target is to ensure RISM continues to be relevant to the members and to the public and becomes sustainable in the long term.

With younger professionals entering the field, how will you facilitate knowledge transfer and ensure a seamless integration of their innovative perspectives with the existing expertise of seasoned surveyors?

RISM strives to be a centre of excellence. Senior members of the 4 disciplines have been coming forward to share their experience and knowledge vide various engagements and sharing sessions and this has been received well by the younger members. We hope this practice will continue to provide the mentoring needed by the younger professionals.

The term of RISM's presidency is limited, but the impact can be long-lasting. How do you intend to craft strategies that ensure the initiatives you set in motion today continue to yield benefits for RISM members beyond your tenure?

The 1 year term of service is certainly rather short for a President but I hope that the humble efforts the Council members and I intend to achieve will continue to benefit the members.

Startups can bring fresh ideas. How can RISM collaborate with startup accelerators to launch innovation challenges, inviting startups to solve real-world industry problems?

We should always be open to innovations which can improve the quality of work performance or provide solutions or even add value to existing ideas or processes. By raising adequate financial resources, RISM can provide grants for innovators who have good potential especially in technology driven innovations.

Imagine you're looking back from 2030 on the state of the real estate industry. What groundbreaking trends or practices do you envision that are reshaping the industry, and how did your experiences influence the emergence of these innovations?

Technology dan sustainability seem to be shaping up real estate industry the last few years. The advent of Artificial Intelligence (AI) and Machine Learning (ML) with Internet of Things (IoT) has changed the quality of life and made work processes simpler and quicker with automation. The pandemic in 2020 had in fact accelerated the embracing of technology. With the depletion of natural resources on the planet, it has also become increasingly urgent to address sustainability issues for the sake of the future generations.

I have been able to strike a balance all this while so becoming the President of RISM actually helps me to manage my personal growth and well being.

Climate change poses significant challenges to property management and development. Drawing from your experience, how can the real estate industry lead in adopting sustainable practices that enhance resilience against environmental impacts and ensure long-term asset value?

Climate risk has devastating impact on the built environment. The real estate industry needs to adopt sustainable practices before its too late. Property development needs to minimise environmental impact such as green construction methods, usage of sustainable building materials, green building design and structure and using renewable energy to power the building and less waste production. Better quality of construction workmanship with less defects will also help property management reduce operating expenses.

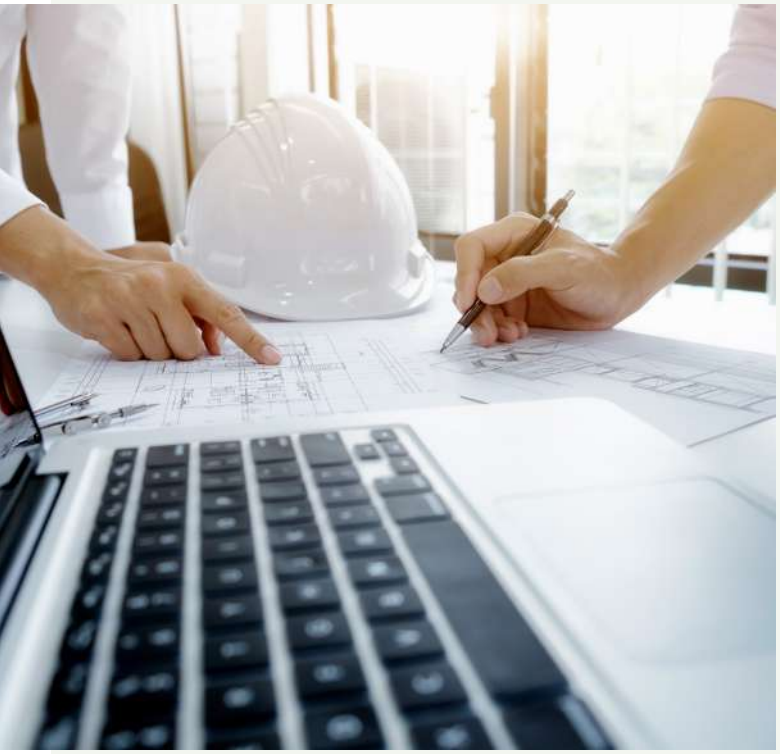
Urban development often intersects with social inequality. How can future property management and surveying strategies contribute to creating inclusive cities that provide affordable housing, efficient transportation, and equal access to amenities for diverse communities?

Social polarisation used to segregate communities and caused inequality. Of late, inclusive cities have replaced this not only to provide affordable living accommodation, public transportation and amenities but also employment and economic activities. The role of surveyors would be to add value to the development and management process. This can be achieved by adopting technology in planning and design and eventually upon completion, the management of the property.

Urban mobility plays a crucial role in property demand and urban planning. How can the industry integrate innovative transportation solutions that reduce congestion, promote sustainability, and enhance property values in urban areas?

Urban areas are mostly almost fully developed and have been affected by degeneration due to old buildings which are not presently the highest and best use. Public transportation has unlocked some of the development opportunities but unfortunately, have not solved the traffic congestions even with the new road networks. The solution should be to reduce the number of vehicles on the road by promoting neighbourhoods which have everything reachable within 10 minute walk.

> **To achieve this, urban planning needs to look at rezoning certain parts of the city and create neighbourhoods with high density catchment to generate economic activities to serve the immediate area without having to travel far thus reducing the need for transportation.**



Traditional property valuation models may need to evolve. How can the industry incorporate intangible factors such as environmental impact, community well-being, and technological infrastructure into valuation methodologies?

Property valuation traditionally examines the historical comparable transaction data and factors affecting the value of the subject property. Location is an important factor which affects property value. Aspects such environmental, community and good technology infrastructure features can built into the valuation as part of the location. The valuer's knowledge and skill are utmost important in order to give the correct and deserving opinion of value.

Given your background, how can existing buildings in Malaysia be retrofitted with green technologies to improve energy efficiency, reduce carbon footprint, and align with the nation's sustainability goals?

Building owners have been known to retrofit existing buildings to meet tenant's demand for green and sustainable accommodation. MNCs with strong policies on ESG are willing to pay higher rental for such buildings due to the special needs and cost of retrofitment. The government or local authority should also provide incentives to encourage building owners to do so.

The circular economy is gaining traction globally. How could Malaysia lead the way by integrating circular principles into national policies and real estate practices, minimizing waste and promoting resource sustainability?

The concept of circular economy involves use of resources maximally and minimising waste which can be achieved by introducing relevant policies to encourage sustainable practices and incentives such as carbon credit vide Bursa Carbon Exchange by Bursa Malaysia. Greenhouse gas emission for instance can be reduced by circular use of cement, steel, plastics and aluminium involving maintenance, reuse, refurbishment and recycling without degrading the quality of the materials.

Green financing is essential for sustainable projects. How can Malaysia stimulate the adoption of green finance mechanisms that incentivize developers to invest in eco-friendly real estate projects?

The ESG agenda is driving the green financing incentives. So far financial institutions have come up with sustainability linked loans, solar financing and sustainable trade finance solutions. The Sustainable Finance Framework for green building developers and owners to develop green real estate and the Smart City Sustainable Financing Framework to support companies that contribute towards the creation of sustainable and smart cities have recently been introduced by UOB. There are more than 400 green projects that have been registered, totaling more than 400 million sq ft in floor area in Malaysia. Such initiatives should also be promoted by local banks in order to encourage more to join up.

SUSTAINABLE DEVELOPMENT GOALS

SUSTAINABLE DEVELOPMENT GOALS:
THE SUSTAINABLE ROLE OF QUANTITY SURVEYORS

RISM QS Publication Subcommittee

1.0 INTRODUCTION

The Sustainable Development Goals (SDGs), comprising 17 global objectives by the United Nations in 2015, tackle challenges like poverty, inequality, climate change, for a better world by 2030. Encompassing health, education, clean energy, urbanization, SDGs have specific targets and require collaboration for a sustainable future.

Decent Work and Economic Growth

COVID-19 has caused global economic setbacks which also has impeding decent work goals. Recovery varies; developed economies rebound, while least developed countries (LDCs) face closures. Small businesses in low-income nations whom already vulnerable, suffer.

Recovery faces COVID-19 waves inflation, disruptions, labor market issues. The Ukraine conflict adds to concerns.

Construction, a key employment source, hit by supply chain disruptions, labor shortages. Small construction businesses face hurdles. Quantity surveyors, experts in cost management need to adapt. Supporting the industry is vital for decent work and sustainable development.

Industry, Innovation and Infrastructure

Post-COVID manufacturing recovery affects sectors, including construction. Global manufacturing growth slowed from 7.4% in 2021 to 3.3% in 2022, impacting supply chains and construction. Quantity surveyors' role gains importance.

Quantity surveyors manage cost estimation, budgeting, ensuring financial transparency in construction projects, pivotal in tackling manufacturing disruptions. Fluctuations in manufacturing growth lead to supply chain disruptions, affecting materials and project costs. Their expertise in evaluating costs, finding alternatives, optimizing resource allocation ensures construction project viability.

Emphasis on technology, resilient infrastructure aligns with quantity surveyors' role. Integration of digital tools for efficient project management, cost control aligns with Goal 9's innovation. Quantity surveyors contribute to modern practices, enhancing project resilience.

Pandemic effects, including on manufacturing employment and small enterprises, resonate in construction. As supply chains face disruptions, construction projects encounter delays, financial implications. Quantity surveyors mitigate manufacturing impact through cost analysis, contingency planning, and efficient resource allocation.

Reduce Inequalities

Sustainable development momentum grows, driven by initiatives like SDGs addressing socio-economic, environmental issues. Goal 10 centers on reducing inequalities - income gaps, education, gender disparities healthcare imbalances. SDGs promote equity through initiatives, like fair trade, climate justice, microfinance, affordable housing, gender quotas.

Quantity surveyors, in the construction sector, advance sustainable development, combat inequalities. Their role spans overseeing costs, resources, waste reduction, aligning with environmental preservation. By practicing cost control, quantity surveyors make infrastructure projects feasible, promoting social equity. In affordable housing, their expertise bridges shelter gaps, assures quality. Community engagement, labor standards advocacy, inclusive design, sustainable materials, data-driven decisions contribute to SDGs, aligning quantity surveyors with broader SDG achievements. Their comprehensive expertise in cost management, resource allocation, collaboration positions them to advance SDGs within construction.

Sustainable Cities and Communities

Goal 11 envisions inclusive, resilient, eco-conscious cities. Quantity surveyors, managing construction costs and contracts are instrumental.

Significance in delivering sustainable urban development aligning with SDG 11 is multifaceted:

- Cost Efficiency: Meticulous cost analysis optimizes expenses, resource allocation, minimizing wastage, ensuring urban project economic sustainability.
- Lifecycle Costing: Evaluating material costs over project lifespan empowers informed decisions prioritizing environmental impact, reducing maintenance costs, fostering sustainability.
- Green Building Practices: Evaluating sustainable feature costs and benefits supports green building practices aligning with environmental objectives.
- Social Equity and Accessibility: Collaboration with architects, designers ensures universal design, assessing cost implications for inclusive urban spaces.
- Facilitating Sector Partnerships: Quantity surveyors play a pivotal role in developing, managing partnerships, monitoring costs, and financial aspects.

In summary, quantity surveyors significantly contribute to SDG 11. Expertise in cost estimation, financial analysis, project management enhances urban development. Ensuring projects are financially viable, eco-friendly, socially inclusive, quantity surveyors play an essential role in creating sustainable cities and communities.

2.0 CONCLUSION

Quantity surveyors are one of the contributors to SDGs. Their diverse skills, from cost management to sustainability, foster economic recovery, reduce inequalities, and promote responsible consumption in the construction sector.

Their efforts steer construction toward sustainable urban development, aligning with UN SDGs. In doing so, they shape an equitable, eco-conscious and prosperous future for all.

Responsible Consumption and Production

Responsible consumption positively impacts nature and quality of life. Quantity surveyors contribute in managing budgets and contracts which impacted consumptions.

- Adherence to Green Building Standards: Quantity Surveyors are pivotal in suggesting and obtaining sustainable building materials adhering to recognized green building standards like Green Building Index (GBI) and Leadership in Energy and Environmental Design (LEED).
- Environmental Regulations and Compliance: Quantity Surveyors allocate budgets for adhering to environmental regulations, including energy efficiency, water efficiency, indoor environmental quality, and construction site safety.
- Effective Waste Reduction and Management: Quantity Surveyors precisely estimate and procure construction materials using measurement tools or applications, minimizing waste and reducing the environmental impact of excess material disposal.
- Assessment of Cost-Effectiveness: Quantity Surveyors collaborate with project teams to evaluate life cycles of construction materials, considering sustainable choices' long-term costs and benefits. This showcases how eco-conscious decisions lead to lower operational costs over time.

In summary, quantity surveyors drive responsible consumption, benefitting environment and future generations.

Sustainable Facilities Management (SFM): The Benefit of Building Performance Assessment on Sustainable Facilities Management

Sr Dr. Syamilah bt Yacob
Vice President, Building Surveying Division
Session 2023/2024

1.0 INTRODUCTION

Climate change is the global issues and nowadays it becomes the most important issue in the world. To address the issue, the sustainability agenda needs to be incorporated into built environment to give a significant impact to our environment. Sustainability is characterized as the ability to maintain at a particular rate or level, or support a process continuously over time without being harmful to the environment or depleting natural resources. According to Moayedi (et al 2023), facilities management (FM) is regarded as having the greatest potential to drive and incorporate the sustainability agenda into the built environment. FM in the industry of environment involves numerous expertise, technology and finance especially from the management side, society and also economy.

According to ASRA (2016), one essential aspect of FM, other than the emphasis on technical operation, is its performance and this indicated FM is in a greater potential to participate in delivering a sustainable environment for the industry. FM, which influences an organization's ability to act proactively and meet its requirements by optimizing its costs and performance of facility services. The combination of FM and sustainability principles in the building can be a potential solution to maintain and manage the building efficiently and effectively.

Sustainable facilities Management (SFM) is crucial to maintain long-term ecological balance and also its performance towards physical condition, cost of operation and maintenance, space, sustainability and value of building. SFM also plays a significant role in supporting the organization's sustainability agenda. So that, the Building Performance Assessment (BPA) as a tool is important as systematic approach in managing building performance to meet the quality of service delivery towards SFM. Explanations of BPA will be based on Building Performance Guideline issued by Public Work Department of Malaysia (JKR).

2.0 WHAT IS FACILITIES MANAGEMENT SUSTAINABILITY

Facilities management sustainability is an organization process of changing, how its physical environment operates to minimize its harmful impact on the environment and people. Facility Management contributes to the economic sustainable development in two ways. On the one hand, it is responsible for the improvement of the main activities within organizations; on the other hand, it supplies services in the areas space and infrastructural and people and organization (Munteanu, Ana and Mehedintu, Gabriela, 2015). SFM practices can be develop from the process of FM which is considered development in three main fields: society, economy, and environment.

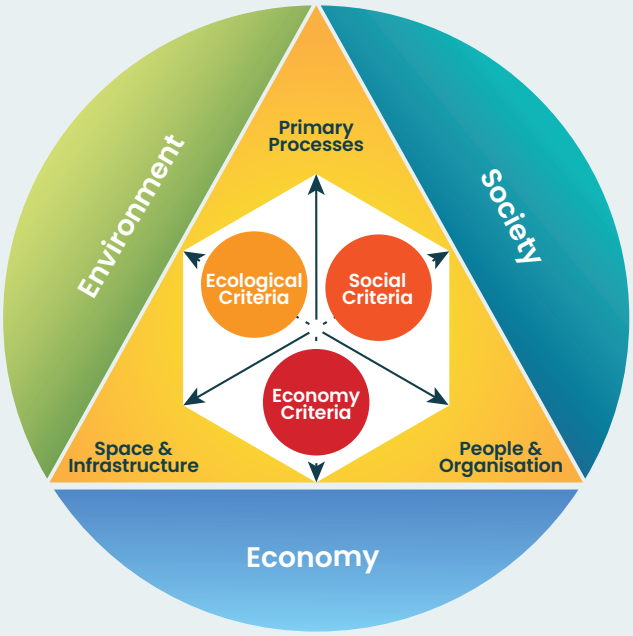


Figure 1 : Basic structure of Sustainable Facility Management (SFM)
Source : Junghans, A., 2011.

According to Junghans (2011), SFM are connected to the society by supplying the adequate buildings for work and life work and compliance with health, safety and security requirements. On the other hand, for the economy, SFM related to building space optimization for a most efficient usage, optimization of building life-cycle costs and facilitating the most efficient management methods. Besides that, SFM for the environment related to ecological targets which is reduction of resources, usage of recyclable building material, reduction of energy consumption and usage of renewable energy sources, reduction of space requirements and soil sealing, safeguarding the ability to maintain and de-construct buildings, preventing the usage of material causing excessive emissions.

3.0 BUILDING PERFORMANCE ASSESSMENT (BPA)

Building performance assessment is a continuous or periodic evaluation process of the actual performance of the building through quantitative and qualitative methods compared to the objectives, targets, or standards set to determine follow-up actions (maintenance / restoration / modification / upgrade / disposal). It also defined as continuous inter-relationship between an asset's capacity and utilization, budget and actual expenditure, possible and actual condition, and the asset's replacement cost and depreciated value as criteria for integrated performance measurement and benchmarking (AAMCoG, 2008). Building performance reflects how well a building carries out its functions. It is crucial to monitor and evaluate the building performance towards SFM to ensure the building quality for occupation and operations. It also focuses on the relationship between design and technical performance of building in relation to human behavior, needs and desires.

Government agency, such as Public Work Department (JKR), have adopted and are practicing FM at the moment. JKR as secretariat of Jawatankuasa Pengurusan Aset Kerajaan (JPAK) responsible to ensure the implementation of FM in Malaysia especially for government building in line with Tatacara Pengurusan Aset Tak Alih version 2 (TPATA V2) to ensure the government assets being managed and planned systematically. The evaluation of BPA is based on five (5) criteria set up in the guideline. The proposed of BPA are to ensure the performance of the building achieved SFM which can create a good brand image for the clients or owner of the building. Beside that to reduce energy consumption costs, promote green procurement and people.

BPA implemented and evaluate to give a various outcome and benefit to the owner of the building toward FM. It is to ensure the functionality of building asset and asset life cycle and benefits Optimization especially in terms of operational and maintenance costs. It also become decision making support tools for effective budget preparation. The BPA will evaluate based on five (5) criteria which is physical condition, operational efficiency, space usage, sustainability, and value of asset with different range of weightage.

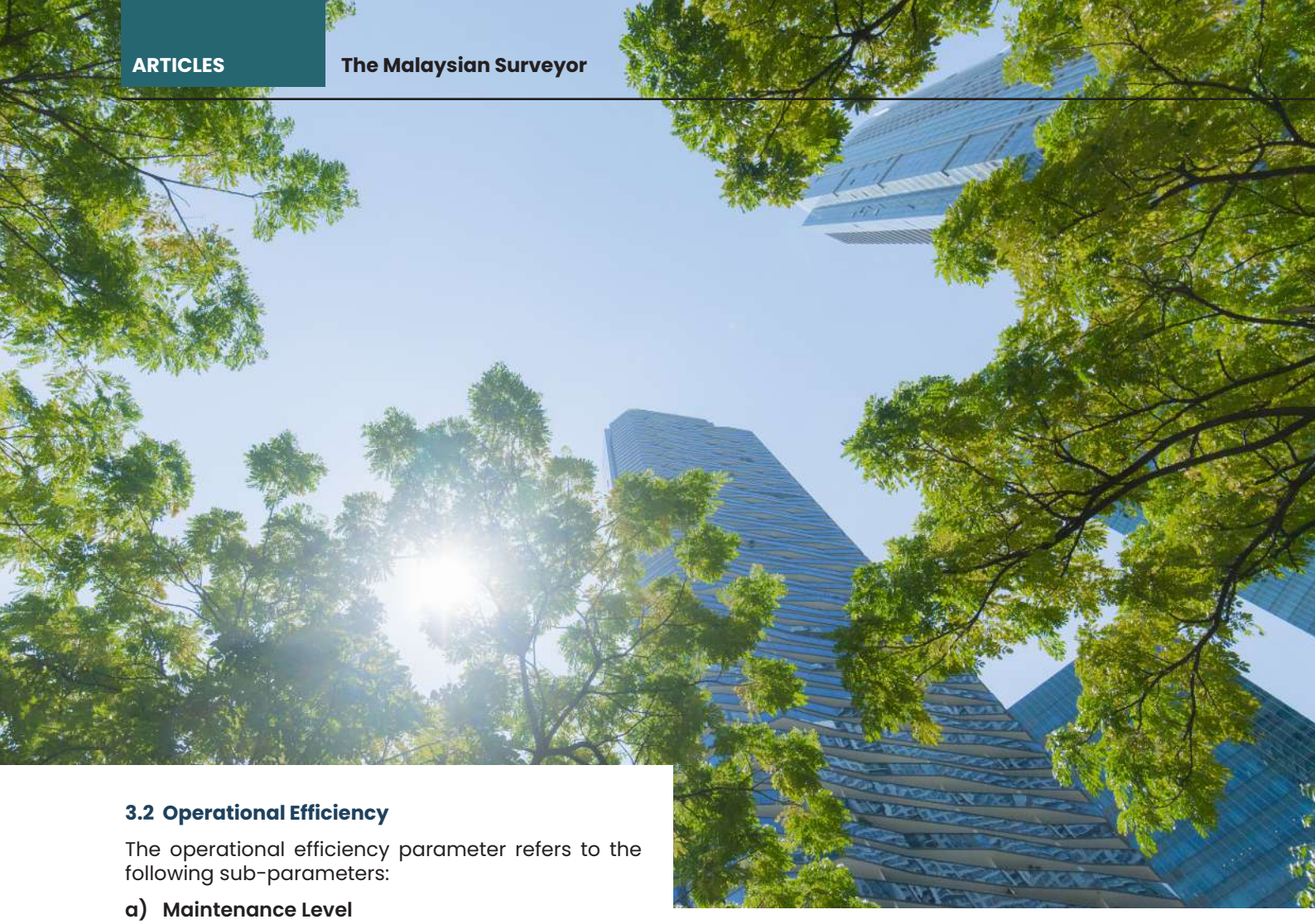
Figure 2: Building Performance Assessment Criteria
Source: GP Penilaian dan Penarafan Bangunan JKR, 2018

3.1 Building Condition Assessment (BCA)

Building performance can be measured in many ways, the most common being condition. According to Abbot (2007), building condition reflects the physical state of the buildings hence its performance. According to Straub (2009), condition assessment is a tool for assessing the technical performance of the properties to long-term maintenance expectations. Condition assessment also a process for inspecting and reporting the physical condition and functional performance of building and infrastructure systems and components. The aim of Building condition survey is the important stage to provide adequate information for appropriate repair work of the building to control defects and preserve the building (Johar et. al, 2013; Ahmad, 2004).

Assessment of physical condition is based on visual inspection as below. Results of the BCA will be analyzed for the purpose of building rating.

a) Physical condition of the building
b) The condition of the building structure
c) Any additions or changes affecting the structure of the building
d) Other conditions that may affect occupant safety based on function of the building.



3.2 Operational Efficiency

The operational efficiency parameter refers to the following sub-parameters:

a) Maintenance Level

Performance Maintenance Level Performance is a set of values the achievement rating of the measured maintenance for the followings:

i. Achievement of general maintenance;
ii. Achievement of repair maintenance;
iii. Achievement of preventive maintenance; and
iv. Customer Satisfaction Survey Results.

The measurement for each maintenance activity is based on Agreed Service Level (ASL)

b) Cost Effectiveness

Cost effectiveness is the allocation received compared to the total expenditure actual for the current year for three (3) items below :

i. Maintenance
ii. Emolument Management
iii. Utilities.

The building maintenance cost involved is based on six (6) main activities namely:

i. Civil & Structural Maintenance
ii. Maintenance of Hygiene Care (Housekeeping)
iii. Landscape Maintenance
iv. Mechanical Maintenance
v. Electrical Maintenance
vi. Pest Control Maintenance

3.3 Space Management

Space usage parameters in these guidelines refer to the following:

a) Compliance with Space Standards;

Assessment for compliance with space standards involves the following spaces:

i. Work space
ii. Shared Space
iii. Foyer
iv. Service room

b) Space Utilization Rate;

i. Space Occupancy Rate
ii. Frequency Rate of Space Use

c) Building Occupant Satisfaction Study (based on Level 1 POE questionnaire)

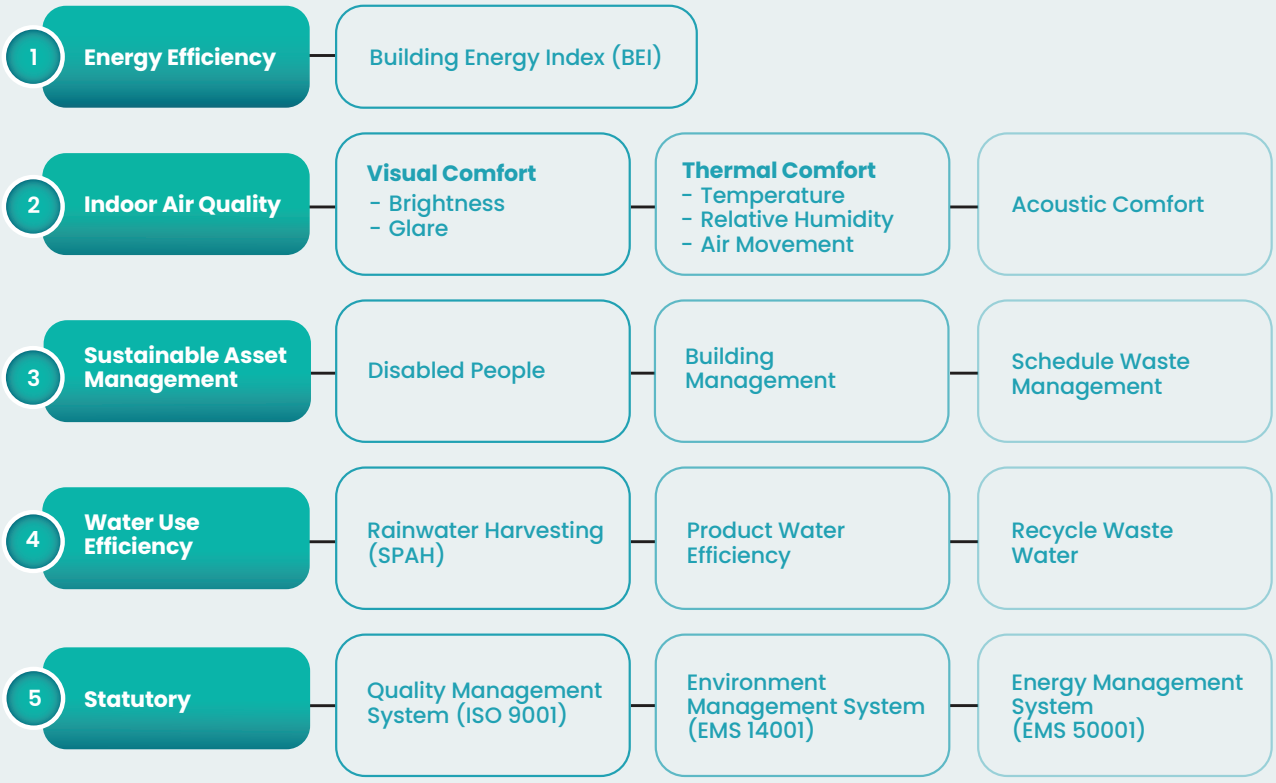
The building occupant satisfaction study aims to measure the effectiveness of the design meet the needs of the building occupants and gather information for improvements to the building design brief. This study also takes into account several factors such as facilities, environment, architectural design, location, spatial layout, maintainability, building finish, health and safety. It involves the following respondents:

i. Building Occupants;
ii. Building Manager/Operator

3.4 Sustainability

The sub parameters that have been identified to evaluate the sustainability features as below. Figure 3 shows that the example of sustainability parameter to be evaluated for buildings.

i. Energy Efficiency
ii. Quality of Indoor Environment
iii. Maintenance of Sustainable Assets
iv. Water Use Efficiency
v. Statutory Maintenance



3.5 Value of Asset

There are two (2) sub-parameters that are taken into account, namely:

a) Facilities and Support Services

Facilities and Support Services Facilities and support services refer to the facilities available at inside, outside or near a premise and benefit users the premise. It consists of :

i. Community facilities such as halls, playgrounds, courts sports and others
ii. Public transport system facilities such as buses, taxis and systems rail transport
iii. Other facilities such as banking services, services health, post office, childcare center, mosque and others.

b) Customer Satisfaction Study

Customer Satisfaction Survey Customer satisfaction survey consists of the following:

i. Internal Customer Questionnaire
ii. External Customer Questionnaire

4.0 PERFORMANCE RATING

The general evaluation level is based on the table 1 below. All the evaluation process will based on user manual in the GP Penilaian dan Penarafan Bangunan JKR, 2018.

LEVEL	DESCRIPTION
3 (Good)	No defect / damage, asset condition is good and can work well
2 (Moderate)	There are minor defects / damages, the condition of the asset is moderate and it can still work but needs to be monitored
1 (Poor)	Poor / critical asset condition, asset cannot function according to agreed service level

Table 1: Asset Performance Evaluation Level Table

The rating of the building toward sustainability is determined through a sar rating based on final assessment score.

MARKS	RATING	DESCRIPTION
»90	★★★★★	Asset is in excellent condition, working fulfill the design purpose and legislation, has the characteristics of sustainability a high, very high level of security well, the economic level as well as the use of assets which is optimal.
70 « marks « 90	★★★★	Assets are in good condition, functioning well design and legal purposes, has the characteristics of sustainability satisfactory, high level of safety and economic as well as good use of asset.
50 « marks « 90	★★★	Assets are in moderate condition, working fulfill the design purpose and legislation, there are characteristics of sustainability, level simple security, level economy as well as moderate use of asset.
30 « marks « 50	★★	Assets in poor condition, functioning to meet design and legal purposes, none characteristics of sustainability, the level of safety low, economic level and consumption and bad use of asset.
«30	★	Assets in poor condition, not working fulfill the design purpose and legislation, no sustainability features, level very low security, economic level as well as weak use of asset.

Table 2: Building Rating Classification Table

5.0 THE IMPORTANCE AND THE BENEFIT OF BUILDING PERFORMANCE ASSESSMENT IN SFM

The implementation of performance evaluation in FM and building rating to the building will have an impact to the client or owner of the building. The building performance which consist of various criteria toward sustainable can give the benefit to the owner by assist in drafting a more accurate and effective annual budget. It also can be the basis for the asset planning in addition to facilitating operational activities and maintenance. However, it has been shown that sustainable facility management is not just about minimising the impact of buildings. Sustainable facility management has repercussions for buildings, people, and organisations. Therefore, it is worth exploring the benefits of sustainable facility management – tangible and intangible.

FM influences working condition and therefore productivity. With the result of BPA, the condition of the building can be well managed and maintain to give comfort to people in a such of temperature, air humidity, good indoor air quality and etc. It also helps contribute retaining talent productivity, and well-being to the user. A quality workplace with natural light, good ventilation and the right temperature can lead to people missing four fewer days a year. But it is not only this that makes FM a major ally in retaining talent.

Meanwhile for building, BPA obvious benefit of sustainable Facility Management is to decrease the company's environmental footprint. Sustainability parameter in BPA can result reduction of waste by ensuring the mechanical system work more efficient with technology, reduced energy consumption and etc.

Benefit for organization is return of investment. SFM contributes to the company's profit by increased productivity, which allows to increase revenue. And it obviously generates energy savings, which lowers monthly expenses. Finally, because the public values sustainable companies, it brings notoriety. Value of asset also give positive impact to the community especially for wellbeing.

6.0 CONCLUSION

In order to ensure SFM implemented sucessfully, facility manager should play a major in realising sustainability. Their roles are not only limited to managing, but also to facilitate the nation in achieving sustainability. Facilities manager aims to ensure workspaces have a minimal, neutral, or even positive impact on the environment. The performance rating can help the facilities manager to reduce, reuse, recycling resources to create energy-efficient workplace besides to control the financial performance especially to maintain building.

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Mitigating Carbon Footprint in Real Estate

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1.0 INTRODUCTION

In an age of growing environmental consciousness and mounting concerns about the impact of human activities on our planet, the real estate sector stands as a crucial sector in carbon footprint. As cities expand, buildings rise, and communities evolve, the carbon footprint of the real estate industry has become an increasingly prominent concern. The undeniable truth is that real estate development is an important sector in a nation's economic growth and urban development, which plays a significant role in global greenhouse gas emissions.

This article discusses the pressing issue of carbon emissions within the real estate sector. Based on the surrounding issues of carbon footprint in real estate, this article offers insights into the strategies and practices that can effectively reduce it. This endeavor is not merely a theoretical pursuit but a pragmatic call to action—a recognition that the choices made within the real estate industry today have profound implications for the world we inhabit tomorrow.

2.0 WHAT IS CARBON FOOTPRINT?

The term "carbon footprint" encompasses the comprehensive tally of greenhouse gas (GHG) emissions attributed to an organization, event, product, or individual. It represents the collective volume of GHGs generated as a direct or indirect consequence of human activities. Your carbon footprint is the summation of all CO2 emissions resulting from your actions within defined time intervals. Typically, carbon footprints are calculated on an annual basis.

Meanwhile, the term "carbon footprint" in real estate represents the sum of greenhouse gas emissions associated with the production, operation, and demolition of real estate properties. It encompasses the energy consumed to power buildings, the materials used in construction, the transportation required for property management, and the broader environmental impact of land use (Refer to Figure 1). In order to fully understand this multifaceted challenge, it is fundamental to address the carbon footprint more comprehensively.

The carbon footprint associated with the life cycle of a property is a comprehensive assessment of greenhouse gas emissions that spans from its initial construction to its eventual demolition. During the construction phase, embodied carbon emissions arise from the extraction, manufacturing, and transportation of construction materials, as well as the construction process itself. Operational emissions encompass the ongoing energy consumption of the property, influenced by factors such as heating, cooling, lighting, and appliance usage (Chau et al., 2015). Additionally, maintenance, renovations, and demolitions contribute to emissions, making it essential to consider these aspects throughout a property's life span.

Mitigating the carbon footprint of a property's life cycle requires a multifaceted approach. Sustainable design principles can be employed during construction to minimize emissions from the outset, while energy-efficient technologies and renewable energy sources can significantly reduce operational emissions (Pan et al., 2018). Regular maintenance should prioritize energy-efficient solutions, and sustainable demolition practices, including recycling materials and reducing landfill waste, can mitigate emissions during the end-of-life phase (Pan et al., 2018; Chau et al., 2015).

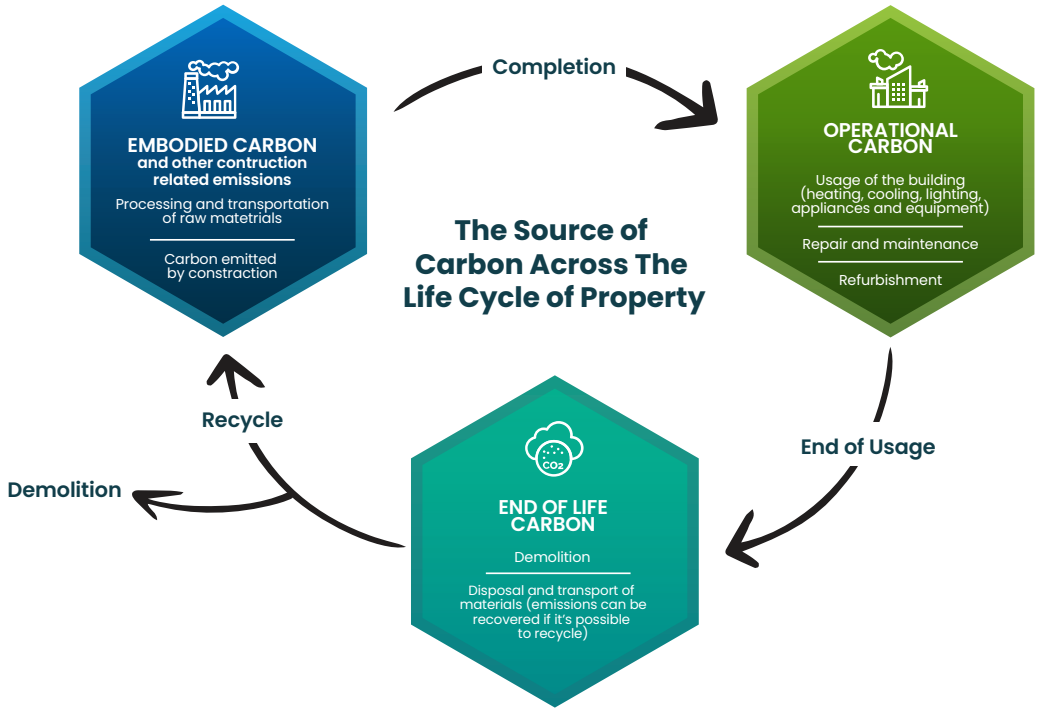

Figure 1: Carbon Footprint from the Life Cycle of a Property (Source: Savills, 2021)

Furthermore, promoting sustainable behavior among property occupants, such as reducing energy and water consumption, plays a vital role in lowering emissions throughout the property's life cycle. By addressing emissions at each stage, property owners and stakeholders can contribute to a more sustainable and climate-resilient built environment.

2.1 Carbon Footprint in Real Estate

As stated, the real estate industry is a significant contributor to carbon emissions globally due to its extensive involvement in property development, operation, and maintenance. Carbon emissions from the real estate sector is divided to several key sources and activities as shown in Table 1.

Real Estate Sector Activity	Description
Building Energy Consumption	Buildings are major consumers of energy for heating, cooling, lighting, and powering various appliances. The type of energy sources used in buildings, such as fossil fuels or renewable energy, significantly influences carbon emissions. Older, inefficient buildings with outdated systems tend to have higher energy consumption and emissions.
Construction and Demolition	The construction and demolition of buildings involve the use of heavy machinery, transportation of materials, and waste disposal, all of which generate emissions. The production of construction materials like cement and steel is energy-intensive and contributes to the industry's carbon footprint.
Transportation and Commuting	The location of buildings influences transportation-related emissions. If a property is in a car-dependent area with limited access to public transportation, occupants and workers are more likely to rely on personal vehicles, increasing emissions. Sustainable urban planning and proximity to amenities can help reduce this impact.
Waste Generation	Waste generated during construction, renovation, and ongoing operation requires disposal, often resulting in emissions from transportation to landfill sites. Sustainable construction practices, recycling, and waste reduction can mitigate this source of emissions.
Facilities Management	Inefficient management and operation of building systems, including HVAC, lighting, and water use, can lead to excess energy consumption and emissions. Regular maintenance, energy-efficient upgrades, and building management systems can help reduce emissions.
Urban Heat Island Effect	Concentrated real estate development in urban areas can contribute to the urban heat island effect, where cities experience higher temperatures than surrounding rural areas due to extensive building surfaces and reduced green spaces. This phenomenon can increase energy demand for cooling and contribute to emissions.
Indirect Emissions	Beyond direct emissions from buildings and construction, the real estate industry indirectly contributes to emissions through the production and transport of building materials, infrastructure development, and the energy required for water and sewage treatment.

(Source: Zhang and Wang, 2017; Marzouk et al., 2017; Peng, 2016; Nadoushani and Akbarnezhad, 2015)

Beyond direct emissions from buildings and construction, the real estate industry indirectly contributes to emissions through the production and transport of building materials, infrastructure development, and the energy required for water and sewage treatment (Marzouk et al., 2017). Measuring and reducing the carbon footprint of a property's life cycle is an essential step toward achieving sustainability and mitigating climate change in the built environment. To mitigate the carbon footprint emission, sustainable construction practices, efficient energy use, and strategic property management are among the important elements.

2.2 Mitigating Carbon Footprint in Real Estate

Mitigating carbon footprint is a crucial aspect of addressing climate change and reducing the environmental impact of human activities. It involves efforts to minimize the emission of greenhouse gases (GHGs), primarily carbon dioxide (CO2), into the atmosphere. Table 2 discusses the various strategies and approaches for carbon footprint mitigation. Reducing carbon emissions in the real estate industry is crucial for mitigating climate change and achieving sustainability goals. It requires collaboration among developers, property managers, policymakers, and consumers to promote sustainable practices, improve energy efficiency, and transition to cleaner energy sources.

Mitigating carbon footprint is a multifaceted challenge that requires coordinated efforts from individuals, businesses, governments, and international organizations. The goal is to reduce emissions while fostering economic growth, improving living standards, and promoting a sustainable and resilient future for all.

Key Strategies	Approaches
Energy Efficiency	Buildings: Implementing energy-efficient technologies in residential, commercial, and industrial buildings, such as LED lighting, efficient HVAC systems, and improved insulation, can significantly reduce energy consumption and carbon emissions. Transportation: Transitioning to energy-efficient vehicles, such as electric cars, and optimizing transportation systems can lower emissions from the transportation sector.
Renewable Energy	Increasing the use of renewable energy sources like solar, wind, hydro, and geothermal power which can replace fossil fuels and reduce carbon emissions from electricity generation.
Green Building Practices	Adopting green building standards and certifications like LEED and BREEAM encourages sustainable construction and design, including efficient insulation, passive solar design, and the use of eco-friendly materials.
Sustainable Transportation	Encouraging the use of public transportation, carpooling, biking, walking, and telecommuting can reduce emissions from personal vehicles. Promoting electric and hybrid vehicles and investing in electric vehicle charging infrastructure which reduce emission from transportation sector.
Waste Reduction and Recycling	Reducing, reusing, and recycling materials can lower emissions associated with waste disposal, as recycling often requires less energy than producing new materials from raw resources.
Carbon Capture and Storage (CCS)	CCS technologies capture carbon dioxide emissions from industrial processes and power plants and store them underground, preventing their release into the atmosphere.
Reforestation and Afforestation	Planting trees and restoring forests can sequester carbon dioxide from the atmosphere, acting as a natural carbon sink.
Circular Economy	Transitioning to a circular economy model, which emphasizes resource efficiency, product longevity, and recycling, which reduce emissions associated with the production of new goods.
Carbon Pricing	Implementing carbon pricing mechanisms, such as carbon taxes or cap-and-trade systems, can incentivize businesses and individuals to reduce emissions by assigning a cost to carbon emissions.
Public Awareness and Education	Raising public awareness about the carbon footprint and the importance of reducing emissions can lead to more sustainable consumer choices and behaviours.
Technological Innovation	Investing in and adopting innovative technologies that reduce emissions, such as carbon capture and utilization (CCU) and advanced energy storage systems, can play a significant role in mitigation efforts.

(Source: Arehart et al., 2021; Gallego-Schmid et al., 2020; Pomponi and Moncaster, 2016)

3.0 SUSTAINABLE DEVELOPMENT GOALS

Sustainable development and the concept of carbon footprint are intertwined, representing two critical aspects of our global commitment to address environmental challenges and build a more sustainable future. Sustainable development seeks to strike a balance between economic growth, social equity, and environmental protection, while the carbon footprint is a measure of the environmental impact, particularly in terms of greenhouse gas emissions.

SDG 7, which focuses on affordable and clean energy, is closely linked to the concept of carbon footprint reduction. Achieving this goal contributes to lower carbon emissions by promoting cleaner energy sources, improving energy efficiency, and advancing sustainable energy practices. This alignment highlights the crucial role of SDG 7 in global efforts to combat climate change and reduce the carbon footprint associated with energy production and consumption.

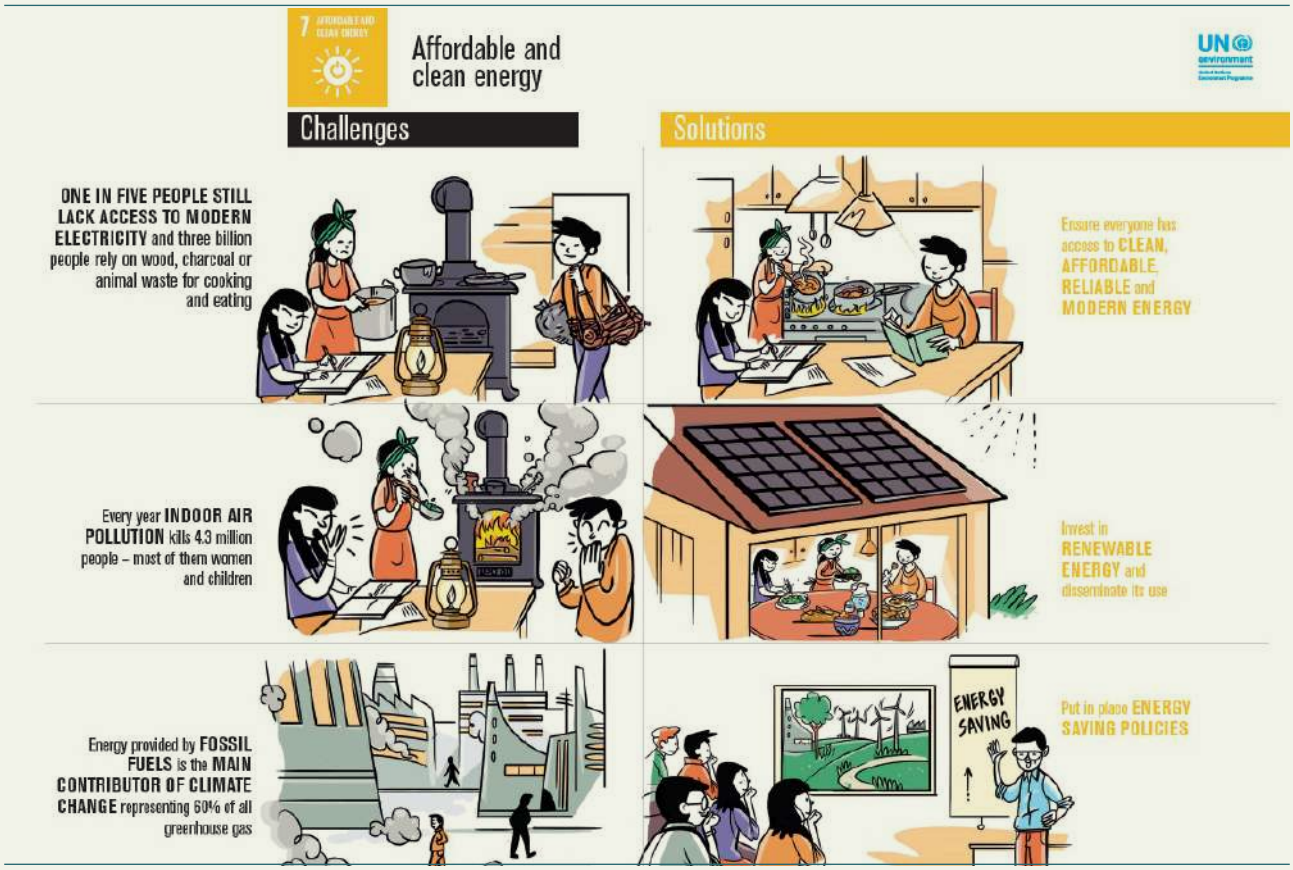

Figure 2: Affordable and Clean Energy Challenges and Solutions (Source: UNEP)

As presented by Figure 2, SDG 7 aims to ensure access to affordable, reliable, and clean energy for all. This goal matters because energy is at the core of modern life, powering homes, schools, hospitals, and industries. It drives economic growth and development, making it essential for reducing poverty and improving people's lives. However, millions of people worldwide still lack access to reliable energy sources. Achieving SDG 7 is not only about expanding energy access but also transitioning to clean and sustainable energy systems to combat climate change and reduce environmental impacts. Focusing on SDG 7, it is possible to make energy cleaner, more affordable, and accessible for everyone while safeguarding our planet.

The Sustainable Development Goals matter because they provide a roadmap for addressing critical global challenges. While specific goals directly address carbon footprint reduction and climate action, it is important to recognize that all the SDGs are interconnected. Achieving one goal often has positive cascading effects on others. For example, reducing carbon emissions not only mitigates climate change (Goal 13) but also improves air quality (contributing to Goal 3: Good Health and Well-being) and can lead to economic benefits (Goal 8: Decent Work and Economic Growth).

The United Nations Sustainable Development Goals encompass a holistic framework for addressing global challenges, with carbon footprint reduction being a critical component of several goals. By working toward the achievement of these goals, we can collectively reduce our carbon footprint, combat climate change, and create a more sustainable and equitable world for present and future generations.

4.0 CONCLUSION

Real estate sector plays a significant role in carbon emissions due to the nature of production, operation and redevelopment of diverse range of interests in it. However, there are numerous opportunities to mitigate carbon footprint from real estate through energy-efficient practices, sustainable construction, smart urban planning, and the adoption of renewable energy sources. Moreover, sustainable real estate practices not only benefit the environment but also offer economic advantages, including reduction of operating costs through energy and water savings, increased property value, and improved well-being. It is a call to action on industry players, policymakers, and stakeholders in Malaysia, including surveyors, to embrace sustainability, reshape industry standards and collectively build a more resilient as well as environmentally responsible end-users for a decarbonized world.

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The Hype with 3D Scanning

A Geomatics and Land Surveyor's Point of View

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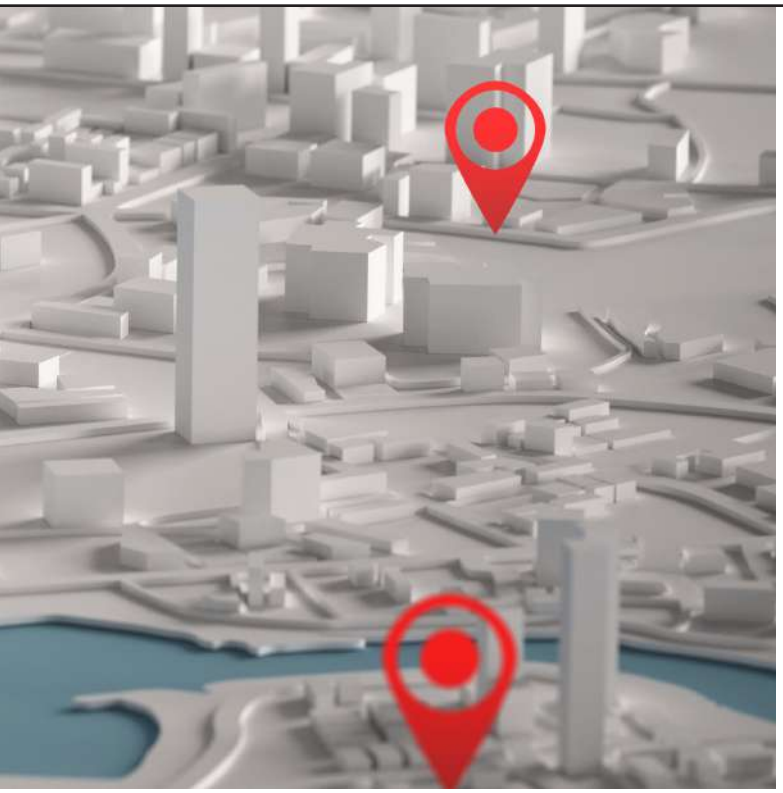
3D scanning works in much the same way as a camera does. Rather than capturing a single image, it captures millions of data points that can be stitched together with post-processing. As a result, a detailed digital representation of the site is created, capturing every nuance and spatial relationship. A single scan provides an incredible amount of detail in the exposed surfaces of the site's entirety. Following the collection of scan data, commonly referred to as point clouds and other attributes, they are converted to a digital model using a combination of hardware and software.

The majority of 3D scanning solutions employ one of the following five techniques: photogrammetry, structured light, laser triangulation, RGB-D, or time-of-flight (ToF). Naturally, each technology has several benefits and drawbacks. In general, photogrammetry is the quickest and has the lowest entry barrier; structured light and laser triangulation typically provide the highest resolution and detail; and RGB-D and ToF provide an excellent balance of high speed and low entry barrier, albeit with limited resolution. 3D scanning is not cheap as it entirely depends on the level of accuracy, and not every job is a perfect fit. Regardless of the technique used, having a rough digital model that can be manipulated, used, and 3D printed remains preferable to having none at all for decision making.

When a large area needs to be measured, physical access is restricted, and the site is so complex that it requires frequent updates, 3D laser scanning is deemed the most advantageous method. This is because the method captures the "as-built environment," which can then be referenced, replicated, monitored for changes, identified for clash detections and salvaged as a "digital model" in the event of an unanticipated disaster to the site. Essentially, it acts as a record or timestamp of a particular moment on the site, and it significantly reduces data collection time when compared to any standard traditional survey. Due to the "hands-off" nature of 3D scanning, it is possible to inspect delicate or hazardous components of real-world objects without touching them. Additionally, it enables visualising the site's space via a point cloud walkthrough, lowering the risk and reducing the cost of frequent travel to remote or dangerous locations. Every measurement may have some degree of human error. It is worth noting that simply quoting the accuracy statement from the scanner specification brochures does not guarantee that the scan will be as "accurate" as the brochure. While the scanner itself may be excellent, incorrect procedures invalidate the results. There is no doubt that good practises lead to the elimination of systematic errors. This is especially needed during scanning in the field and scan registration. Traceability is just as critical as scanning, and it is what distinguishes geomatics and land surveyors from others, aside from their expertise in connecting internal and external references to create a seamless environment. Calibration, initialisation, and linking of scanners to a common vertical and horizontal reference point should occur first.

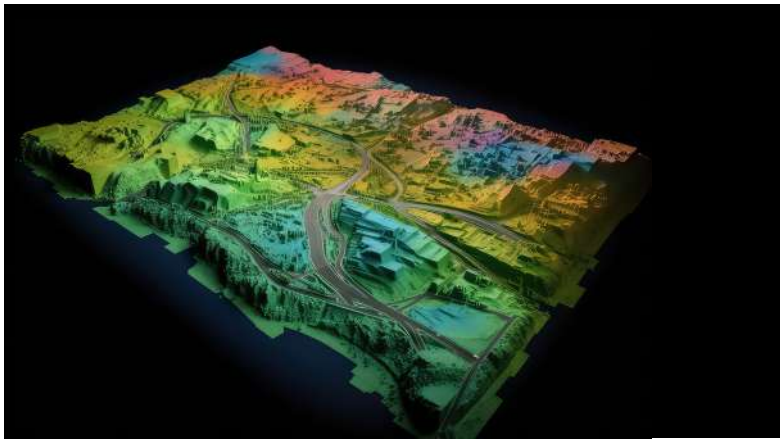


Establishing a survey control network is vital for accuracy, and while each scan generates millions of data points, the resulting file size can easily exceed terabytes, necessitating the use of a large storage device. Survey control points allowed the laser scan data to be merged with other surveying data such as the area's cadastre information, topographic surface, reality capture images and geocoded street addresses. As a result, providing meaningful and comprehensive information and visualisation that could aid in the decision making of the particular model in relation to its environment. To obtain a spatially accurate model and level of details, it is essential to perform overlapping scans, which requires careful planning and connectivity between building blocks, building levels, and the indoors and outdoors.

Objects that are reflective, shiny, or translucent pose difficulties for 3D scanning solutions. The best scanning surfaces are those that have gently contoured surfaces, soft curves, varied or light colour, matte finishes, and opaque. Additionally, lighting is critical and therefore a well-lit environment is favourable. Ambient lighting is preferable to harsh, direct lighting because it can cause problems. Even with the most advanced technology, any movement away from the target object causes the scan to fail. Furthermore, many preliminary scans reveal errant objects, holes, and other anomalies that require correction.

A series of steps can be applied to interpret the point clouds and generate detailed, high-quality models. To begin, the scanned data can be partitioned into smaller areas to aid in visualisation. The point cloud data can then be interpreted further by analysing it, comparing it to the corresponding images, and finally, observing the data's intensity values to verify the accuracy and quality of the measurements made. There is already a wide range of commercial off-the-shelf software available for creating 3D models with varying levels of detail. Some software, such as Autodesk Revit, Bentley MicroStation, SketchUp, MagiCAD, and CATiA, can easily integrate the BIM level of development and the 3D model's level of detail to simulate actual site representation and further collaboration among project team members. The 3D model can also be exported to a specific file format, such as STL or OBJ, for 3D printing if necessary. Following the export process, some additional but minor editing may be required to ensure a flawless printed model.

The use of 3D scanners is indeed timely in times like the current pandemic, when access to a site may be restricted by movement control orders or may require temporary quarantine. With 3D scanners, on-site scanning requires less personnel, and monitoring for updates or identifying clashes on-site can be done digitally and automatically using appropriate software. 3D model walkthroughs are still possible with virtual tours that can facilitate team exploration and discussion during online meetings.
Although the Department of Survey and Mapping Malaysia (JUPEM) is relatively new to terrestrial 3D scanning, the method offers a plethora of opportunities, and the technological revolution is worth exploring particularly for cadastre purposes. Licensed Land Surveyors are beginning to incorporate the 3D scanning method in providing the as-built layout for strata title checking purpose. Furthermore, a survey-accurate digital twin of a city can be developed using a combination of the 3D scanning technology, cadastre, and other geospatial elements. Numerous decision-making tools can be developed to help city management become smarter. The best part is that each object can be linked to its corresponding cadastre, which helps to identify its rights, restrictions, and responsibilities. This is the goal of JUPEM's phase II SmartKADASTER project. A variety of outcomes is anticipated to be realised through the SmartKADASTER project, paving the way for JUPEM's future as Malaysia's leading surveying and mapping agency.



IMPAIRMENT, AUDIT EXAMINATIONS AND ROLE OF VALUERS

By

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The purpose of this article is to examine the requirements of audit examinations on the work carried out by external experts, in particular, valuers. Valuation of real estate is a complicated process and requires lawfully registered valuers under the Board of Valuers, Appraisers, Estate Agents and Property Managers (BOVAEP), to carry out these valuations. Business entities do appoint valuers to carry out valuations of real estate primarily for the purposes of accounting to ensure that the assets are carried at fair value.

1.0 MFRS 136

MFRS 136, which is equivalent to IAS 36 Impairment of Assets was first issued by Malaysian Accounting Standards Board (MASB) on 19th November 2011 and is applicable in Malaysia for annual periods beginning on or after 1st January 2012. In accordance with the MFRS 136, companies are required to carry out an impairment test on the assets that require such tests. MFRS 136 states that:

*"An entity **shall assess at the end of each reporting period whether there is any indication that an asset may be impaired**. If any such indication exists, the entity shall estimate the recoverable amount of the asset". (Paragraph 9)*

Hence, the objective of MFRS 136 is to outline procedures that entities should follow to ensure the amounts recognised in the statement of financial position in respect of assets, not stated above their recoverable amounts.

1.1 Impairment under MFRS 136

Impairment is the loss to an entity in an asset that it holds. This loss is determined by a formula that is:

IMPAIRMENT = CARRYING AMOUNT LESS RECOVERABLE AMOUNT

Recoverable amount has the meaning of

RECOVERABLE AMOUNT HIGHER OF FAIR VALUE LESS COSTS OF DISPOSAL OR VALUE IN USE

Or in other words, the formula can be restated as

IMPAIRMENT = CARRYING AMOUNT LESS HIGHER OF FAIR VALUE LESS COSTS OF DISPOSAL OR VALUE IN USE

It is therefore material to look into the definition of carrying amount:

"Carrying amount is the amount at which an asset is recognised after deducting any accumulated depreciation (amortisation) and accumulated impairment losses thereon" (IFRS Foundation).

Since there is no formula attached to this definition, the interpretation is that carrying amount is the amount at which the asset is included in the books, because generally this is the amount that is recorded after allowing for accumulated depreciation and accumulated impairment losses.

Therefore, for each period,

CARRYING AMOUNT IS FAIR VALUE (OR VALUE IN USE) LESS IMPAIRMENT.

Or to put it in understandable terms, impairment is the difference between the value already in the books (carrying amount) less the value (fair value less costs of disposal or value in use) determined at the end of the period or during the period.

It will then go on to show that if the fair value is determined and the fair value shows that fair value is the same then there is no impairment. This is explained thus:

Period	Carrying Amount	Depreciation	Impairment	New Carrying Amount
	(a)	(b)	(c)	(d)
Period 1	New Asset or New valuation	Nil	Nil	Same Amount
Period 2	Amount from (d) in previous period	xx	yy	Amount in (a) less xx & yy
Period 3	Amount in (d) in previous period	xxx	yyy	Amount in (a) less xxx & yyy

Hence, certain tests or questions need to be asked and answered before accepting the new fair value. This will be to ensure that the fair value is supportable and has been determined in accordance with acceptable standards of measurement.

1.2 Fair Value

Fair value has been defined under MFRS 13 Fair Value Measurement as follows:

"The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date". (Paragraph 9)

By and large, fair value is market value considering the similarity of definitions stipulated in local and international valuation standards. Market value basis is one the principal valuation bases adopted by valuers in their day-to-day work.

1.3 Scope of Work Involved In Impairment Testing

The impairment testing, according to MFRS 136, applies to the following scope of works:

- Biological assets related to agricultural activity that are measured at fair value less costs to sell
- Plant, property and equipment, including revalued assets
- Investment property (measured at cost) Intangible assets, including goodwill and revalued assets

1.4 What MFRS 136 says about the Impairment Testing?

Once the scope of areas for impairment testing is determined, the next thing to determine is whether the asset is an independent asset or part of the Cash Generating Unit (CGU).

"A cash-generating unit is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets." (MFRS 136 Paragraph 6)

Impairment testing is then applied to the above scope of assets to determine the impairment, if any. As explained above, the impairment is the difference between the carrying amount and the recoverable value and recoverable value is the higher of the fair value (less costs of sale) or value in use.

Therefore, the entities are required to have the recoverable value determined for each of the assets under the scope if they are independent or in a group if they form part of a group of CGU.

1.5 Indicators for Determining Impairment

There are factors that need to be looked into in determining impairment, which can be external or internal (MFRS 136 Paragraph 12).

External factors

Amongst external factors are:

- Significant drops in the market value of the asset
- Any changes in the social, economic, legal and market factors that will have an impact on impairment
- Changes in the financial sector such as interest rates and borrowing rates that will have an impact
- The carrying amount is significantly more than its market value

Internal factors

The internal factors to be looked into are:

- Depreciation, deterioration and obsolescence in the asset
- Significant company changes that might take place such as discontinuation of the operations, disposal of assets or parts of it or a review of the economic life of the asset
- Other factors to consider are that there is no active market for the asset and other related issues.

1.6 Recoverable Amount

The impairment amount depends upon whether the carrying amount is lower than the recoverable amount. As defined above recoverable amount is the higher of the fair value less costs of sale or value in use.

"Value in use is the present value of the future cash flows expected to be derived from an asset or cash-generating unit" (MFRS 136 Paragraph 6).

It is interesting to note that rarely is "value in use" used to determine recoverable amount. It is not clear whether the two bases, fair value and value in use can be interchanged or whether if an entity chooses to use fair value then it will be committed to continue using fair value. We believe the latter is the true position.

2.0 REQUIREMENT OF AN EXPERT (VALUER)

As stated earlier real estate valuations are specialised and require the services of a valuers. Companies are allowed to engage valuers as experts to provide them with an expert opinion on market value of real estate assets.

Auditors when required to carry out their audit work are required to critically examine the work of external experts engaged to carry out the specialised work.

The auditor has standards that he has to adhere to. The standards that affect the use of external experts are International Standard on Auditing (ISA) ISA 500, ISA 540 (Revised) and ISA 620 as shown in Table 1.0.

Table 1.0: ISAs related to property valuation work

ISA 500	Audit Evidence
ISA 540 (Revised)	Audit Accounting Estimates & Related Disclosures
ISA 620	Using the Work of an Auditor's Expert

Under ISA 500 for instance, the auditor may use the Management's Expert who is an individual or organization possessing expertise in a field other than accounting or auditing, whose work in that field is used by the entity to assist the entity in preparing the financial statements.

The auditors when engaged to carry out an audit will have to decide whether to engage an external expert or use the expert engaged by the management. The requirements for engaging an external expert is governed by ISA 620.

2.1 When Does An Auditor Require An External Expert?

The auditor (company) may engage an external expert when the subject matter to be audited is of sufficient complexity that the auditor's knowledge of the subject or asset is insufficient for him to carry out the audit correctly especially if he does not possess the necessary expertise to audit the financial statements.

The auditor may determine that the management's expert is sufficient or may choose to appoint an external expert to assist him in obtaining sufficient audit evidence.

The factors he would consider are (ISA 620 paragraph A8):

- Whether management has used a management's expert in preparing the financial statements (see paragraph A9).
- The nature and significance of the matter, including its complexity.
- The risks of material misstatement in the matter.
- The expected nature of procedures to respond to identified risks, including: the auditor's knowledge of and experience with the work of experts in relation to such matters; and the availability of alternative sources of audit evidence.

Where the management has already appointed an external expert, the auditor will be influenced in his determination of audit evidence by the following factors (ISA 620 paragraph A9):

- The nature, scope and objectives of the management's expert's work.
- Whether the management's expert is employed by the entity, or is a party engaged by it to provide relevant services.
- The extent to which management can exercise control or influence over the work of the management's expert.
- The managements expert's competence and capabilities.
- Whether the management's expert is subject to technical performance standards or other professional or industry requirements.
- Any controls within the entity over the management's expert's work.

2.2 Auditors and External Experts

It is the auditor's responsibility that he obtains and checks and confirms all evidence that the accounts are properly drawn and are a true reflection of the company. For this purpose he will have to ensure that all the audit evidence he has obtained have been verified by him. He therefore, has the duty to use an external expert or scrutinise the external expert's opinion, if employed by the management, and ensure that the external expert's opinion has been correctly arrived at.

For these he has to be satisfied that the external expert, whether appointed by him or by the management, has the competence, capabilities and objectivity when carrying out the work and is adequate for the auditor's purpose. This is clearly stated in paragraph A14 of the ISA 620.

The standard to meet appears to be to be 'adequate' for the auditor's purposes. However, the word 'adequate' has not been defined. Hence, what may be adequate to one auditor may not be adequate to another.

2.3 Management Engages an External Expert

Where the management has engaged an external expert to carry out the work, the auditor must satisfy himself of the following ISA 500 paragraph 8:

"If information to be used as audit evidence has been prepared using the work of a management's expert, the auditor shall, to the extent necessary, having regard to the significance of that expert's work for the auditor's purposes; (Ref: Para. A34–A36)

(a) Evaluate the competence, capabilities and objectivity of that expert; (Ref: Para. A37–A43

(b) Obtain an understanding of the work of that expert; and (Ref: Para. A44– A47)

(c) Evaluate the appropriateness of that expert's work as audit evidence for the relevant assertion. (Ref: Para. A48)"

Further, the standard ISA 500 explains that,

Competence relates to the nature and level of expertise of the management's expert.

Capability relates the ability of the management's expert to exercise that competence in the circumstances. Factors that influence capability may include, for example, geographic location, and the availability of time and resources.

Objectivity relates to the possible effects that bias, conflict of interest or the influence of others may have on the professional or business judgment of the management's expert.

The competence, capabilities and objectivity of a management's expert, and any controls within the entity over that expert's work, are important factors in relation to the reliability of any information produced by a management's expert.

In order to satisfy the competence, capability and objectivity of the external expert, the auditor may require information regarding the above from a variety of sources.

- Personal experience with previous work of that expert.
- Discussions with that expert.
- Discussions with others who are familiar with that expert's work.
- Knowledge of that expert's qualifications, membership of a professional body or industry association, license to practice, or other forms of external recognition.
- Published papers or books written by that expert.
- An auditor's expert, if any, who assists the auditor in obtaining sufficient appropriate audit evidence with respect to information produced by the management's expert).

Matters relevant to evaluating the competence, capabilities and objectivity of a management's expert include whether that expert's work is subject to technical performance standards or other professional or industry requirements, for example, ethical standards and other membership requirements of a professional body or industry association, accreditation standards of a licensing body, or requirements imposed by law or regulation. The standard goes on to add

Other matters that may be relevant include (ISA 500 Paragraph A51):

- The relevance of the management's expert's competence to the matter for which that expert's work will be used, including any areas of specialty within that expert's field. For example, a particular actuary may specialize in property and casualty insurance, but have limited expertise regarding pension calculations.
- The management's expert's competence with respect to relevant accounting requirements, for example, knowledge of assumptions and methods, including models where applicable, that are consistent with the applicable financial reporting framework.
- Whether unexpected events, changes in conditions, or the audit evidence obtained from the results of audit procedures indicate that it may be necessary to reconsider the initial evaluation of the competence, capabilities and objectivity of the management's expert as the audit progresses.

The auditor is allowed to evaluate the competence, capability and objectivity of the external expert against technical performance standards or other professional or industry requirements, for example, ethical standards and other membership requirements of a professional body or industry association, accreditation standards of a licensing body, or requirements imposed by law or regulation.

3.0 REAL ESTATE VALUATIONS (REGISTERED VALUERS AS MANAGEMENT EXPERTS)

Valuers who act as management's experts are regulated by law in Malaysia. This would mean that the auditors should be made aware of the regulated nature of the valuation profession, they being registered valuers with the Board of Valuers, Appraisers, Estate Agents and Property Managers (BOVAEP). They have to comply with the strict and mandatory requirements and conditions with the Law, Rules, Code of Ethics, Circulars and Guidance's of the Board.

Additionally, the BOVAEP has set forth mandatory Malaysian Valuation Standards (MVS) which are at parity with the International Valuation Standards (IVS) with this variation that the MVS are real estate based.

In addition, the membership qualification of bodies such as the Royal Institution of Chartered Surveyors (RICS), the Royal Institution of Surveyors Malaysia (RISM) and the Association of Valuers, Property Managers, Estate Agents and Property Consultants in the Private Sector Malaysia (PEPS) are also necessary. These are professional bodies that assist in the preparation and eventual adoption of the regulatory framework for MVS and Code of Ethics and Conduct for registered valuers in this country.

There is a strong emphasis on the objectivity of the expert. These are spelt out in paragraph A18 of ISA 620. The auditor is required to look into circumstances that may threaten the expert's opinion such as self-interest threats, advocacy threats, familiarity threats, self-review threats, and intimidation threats.

Safeguards that can be built into these threats are when the expert's profession is regulated such as for valuers. The Code of Ethics and the MVS has standards that apply to ensure that a valuer is truly an independent expert and carries out his work with total independence and not persuaded by any influence internal or external other than the laws, legislations principles and standards that are prescribed for the nature of work that has been undertaken. In other words, valuers must ensure all of these are clearly understood and spelt out so that the auditor engaged to examine and accept the valuer's work clearly knows that the valuer is an independent expert and his objectivity in carrying out the work is not threatened.

3.1 Auditor's Understanding of the Expert's Area of Work

The auditor may, in order to understand the valuer's work may have discussions with the valuer. He may explore the following (Paragraph A22):

- Whether that expert's field has areas of specialty within it that are relevant to the audit (see paragraph A17).
- Whether any professional or other standards, and regulatory or legal requirements apply.
- What assumptions and methods, including models where applicable, are used by the auditor's expert, and whether they are generally accepted within that expert's field and appropriate for financial reporting purposes.
- The nature of internal and external data or information the auditor's expert uses.

3.2 Working Papers of the Expert

Invariably valuers have been asked to not only explain the methodologies of their valuation and the factors that they have taken into consideration, but also the computations and calculations necessary for the valuer to arrive at his valuation. Obviously, the valuer carries out a lot of calculations and computations depending on his approach and methodology before he arrives at his opinion. His work is never in a vacuum. These are kept in working papers. These working papers are the property of the valuer. He cannot be asked to disclose these papers. In fact the paragraph 29 of the ISA 620 is very clear in that the working papers need not be disclosed to the auditor. If the auditor engages the valuer to carry out the valuation, in other words, the client is the auditor then the standard says the working papers of the valuer will form part of the auditor's documentation. In other cases, the working papers of the expert do not form part of the audit documentation.

"Agreement on the respective roles and responsibilities of the auditor and the auditor's expert may also include agreement about access to, and retention of, each other's working papers. When the auditor's expert is a member of the engagement team, that expert's working papers form part of the audit documentation. Subject to any agreement to the contrary, auditor's external experts' working papers are their own and do not form part of the audit documentation." (ISA 620 para A29 Working Papers)

3.3 Auditor's Expert under ISA620

There are no specific requirements stated in the ISA 500.

Under ISA 620, the auditor has to carry out an evaluation of the expert to ensure the adequacy of the expert opinion. This must be so because the auditor needs an expert to guide him through very complex matters. Seldom, if ever, does an auditor engage an expert of his own to assist him in the determination of the audit evidence. Certain specific procedures have to be adopted by the auditor and these include (ISA 620 Para A33).

- Inquiries of the auditor's expert.
- Reviewing the auditor's expert's working papers and reports.
- Corroborative procedures, such as:
  - Observing the auditor's expert's work;
  - Examining published data, such as statistical reports from reputable, authoritative sources;
  - Confirming relevant matters with third parties;
  - Performing detailed analytical procedures; and
  - Reperforming calculations.
- Discussion with another expert with relevant expertise when, for example, the findings or conclusions of the auditor's expert are not consistent with other audit evidence.
- Discussing the auditor's expert's report with management.

Other relevant matters that the auditor may take into considerations are the following:

- Presented in a manner that is consistent with any standards of the auditor's expert's profession or industry;
- Clearly expressed, including reference to the objectives agreed with the auditor, the scope of the work performed and standards applied;
- Based on an appropriate period and take into account subsequent events, where relevant;
- Subject to any reservation, limitation or restriction on use, and if so, whether this has implications for the auditor; and
- Based on appropriate consideration of errors or deviations encountered by the auditor's expert.

3.4 Auditor's Evaluation of Expert Opinion

The auditor will examine all the underlying assumptions and methods and models developed by the management and if the expert has relied on these assumptions and methods and models whether the expert has adequately reviewed all those assumptions and methods. These will apply mostly in new developments and properties that are dependent on cash flow projections. The valuer cannot adopt the information given by the management without adequately reviewing them.

3.5 Evaluating the Appropriateness of the Management's Expert's Work

The ISA 500 provides various guidelines by which the auditor may evaluate the management expert's work. Paragraph A49 in ISA 500 states that:

"Considerations when evaluating the appropriateness of the management's expert's work as audit evidence for the relevant assertion may include:

- The relevance and reasonableness of that expert's findings or conclusions, their consistency with other audit evidence, and whether they have been appropriately reflected in the financial statements;
- If that expert's work involves use of significant assumptions and methods, the relevance and reasonableness of those assumptions and methods;
- If that expert's work involves significant use of source data, the relevance; and
- If that expert's work involves the use of information from an external information source, the relevance and reliability of that information."

As can be seen the matters highlighted in the above standard is are matters of compliance in the MVS. Everything that is stated above is found within the standards provided in MVS.

In the event the auditor uses his own expert then Paragraph A37 in ISA 620 states that:

"If the expert uses assumptions then the auditor will examine whether the assumptions being used are:

- Generally accepted within the auditor's expert's field;
- Consistent with the requirements of the applicable financial reporting framework;
- Dependent on the use of specialized models; and
- Consistent with those of management, and if not, the reason for, and effects of, the differences."

The auditor is also required to test the source data. If in cases where the source is external then the auditor may require to test the data. If the test data is very complex and special to the expert's areas of expertise then he may want the expert to test the source data. Paragraph A39 sets this out as follows:

"In many cases, the auditor may test source data. However, in other cases, when the nature of the source data used by an auditor's expert is highly technical in relation to the expert's field, that expert may test the source data. If the auditor's expert has tested the source data, inquiry of that expert by the auditor, or supervision or review of that expert's tests may be an appropriate way for the auditor to evaluate that data's relevance, completeness, and accuracy."

Again for clear understanding, it is reiterated that there is nothing in the above standards that are not found in the MVS. The MVS is, for purposes of clarity, mandatory standards for registered valuers.

4.0 CONCLUSION

The valuer's role in determining fair value of property assets for financial reporting purposes is not new. In fact, changes in accounting and auditing standards with regards to property, plant and equipment and investment property require the engagement of registered valuers. However, it has also invited more scrutiny from auditors considering the requirements of different ISAs. What is important to note is that valuers are registered and regulated by an Act of Parliament in this country. There are specific mandatory standards and codes of ethics for registered valuers. They are often members of professional bodies. Hence, auditors when scrutinising the management's experts need to be well versed in the fact that registered valuers are also subject to strict scrutiny and compliance with all laws, regulations, circulars, guidelines, standards and code of ethics by the BOVAEP.

Valuation is a tertiary education in Malaysia, United Kingdom, Singapore, Australia, Hong Kong, New Zealand etc. There are rigorous and robust practise requirements, compulsory years of practice and a Test of Professional Competence (TPC) before a valuer can be registered. His professional practice requires the compliance with mandatory valuation standards. Often her valuation reports are speaking reports and they explain in detail the conclusions arrived at. All supporting information is provided. Opinions of value are formed not only based on the mathematical computations but also by way of years of solid experience and thorough knowledge of the practitioner. There is no substitute for experience in the science of valuation!

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EMERGING PRACTICAL ISSUES IN MALAYSIAN STRATA PROPERTY REGULATION

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1.0 INTRODUCTION

The nature of stratified property necessitates a special regulatory framework to provide for ownership rights in airspace and intensive property management. In recent years, there has been a slew of strata-related issues in Malaysia due to previously unforeseen factors, which were either absent or underprovided in the strata legal framework. At this point, the lack of systematic examination and discussion on the practical issues prevents potential opportunities for improvement and even fosters higher uncertainties among the stakeholders. This article highlights these practical issues to inform the stakeholders, namely developer, management bodies, surveyors, policymakers, strata law administrators, buyers and proprietors.

In layman's term, "strata" or "stratum" means layers that are normally stacked parallel on one another. For the general public, strata properties are commonly regarded to mean subdivided building for accommodation e.g. flats, condos, apartments, etc. However, non-residential strata property such as shop lots, SOHOs, SOVOs, service apartments, office suites, etc. has become more pervasive. Additionally, the traditional concept of strata property being high density development has evolved to include lower density development vis-à-vis landed strata units, also known as horizontal strata. Thus, strata properties in Malaysia now comprise vertical and/or horizontal subdivided building and/or land on a master lot under single use or multiple uses.

Strata property has unique characteristics: the legal distinction between individual and shared spaces, the sharing of common property, management of common spaces by statutorily instituted bodies, pooling of financial resources to manage the common property, and specifically for residential strata, balancing community living with individual property rights. Present within any existing strata schemes are multiple stakeholders including proprietors, management bodies, developer (to a certain degree), tenants, contractors, visitors, etc. who each has different roles, functions, rights, interests and needs. As such, a good regulatory framework is necessary to clarify rights and liabilities, confer duties on respective parties and ultimately, ensure the strata development is conducive for living and/or working.

2.0 A PRIMER ON STRATA REGULATORY FRAMEWORK

In Peninsular Malaysia, strata regulation comprises two main acts namely the Strata Titles Act 1985 ("STA") and Strata Management Act 2013 ("SMA"). Table 1 provides a comparison between STA and SMA. Whilst both deal with subdivided building and land parcels, STA essentially regulates the title and dealings pertaining to subdivided building and land parcels and is under the purview of the Ministry of Natural Resources, Environment and Climate Change (previously Ministry of Energy and Natural Resources), whilst SMA was enacted to ensure the proper management and maintenance of strata property and is administered by the Ministry of Local Government Development (previously Ministry of Housing and Local Government). The operation of STA is by the Office of Lands and Mines (Pejabat Tanah dan Galian or "PTG") whilst SMA is overseen by the Commissioner of Building ("COB") at the local level. SMA is further strengthened by Strata Management Regulations 2015 ("SMR"), which details out the broad provisions of the act.

STA has come a long way from its subsidiary title origin in the National Land Code 1965; similarly, SMA has significantly evolved from its predecessor, the Building and Common Property Act 2007. Both acts have been amended at several points in time to adapt to socio-economic transformations. The latest amendment of STA in 2013 resulted in Strata Titles Act (Amendment) 2013 ("Act 1450"), which now affects in the issuance of strata titles together with vacant possession. This is to expedite the Perfection of Transfer (POT) to parcel buyers, ultimately hastening the management period by the Management Corporation (MC). Importantly, SMA only came into effect in June 2015, meaning that older strata schemes have to catch up with the new strata management requirements.

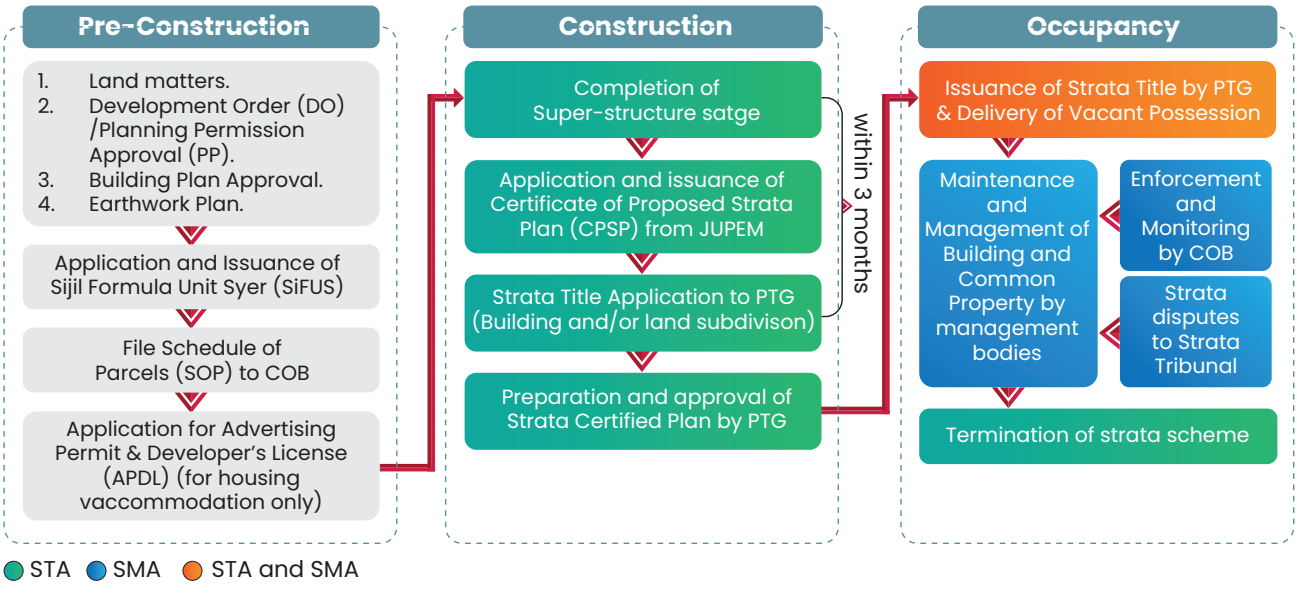
Table 1: Comparison between STA and SMA

	STA	SMA
Objective	Mainly about strata title i.e. property rights in strata scheme.	Mainly about maintenance and management (M&M) of strata scheme.
Administration	Under PTG i.e. Ministry of Natural Resources, Environment and Climate Change (KETSA) to regulate: • Strata title. • Strata dealings. • Termination of strata scheme.	Under Local authority i.e. Ministry of Local Government Development (KPKT) to regulate: • Management bodies. • Governance of the strata scheme. • Management of the strata schemes.
Management bodies	Only contains provisions for management by developer and MC.	Contains provisions for management by developer, **JMB**, MC and **Sub-MC**.
Limited Common Property (common property that can be used exclusively by at least 2 proprietors)	No provision	Strata Management Tribunal
Dispute resolution	No dispute resolution mechanism	Strata Management Tribunal

[1] Sarawak's strata legislation is *Strata Titles Ordinance 1995* whilst Sabah's strata legislation is *Land (Subsidiary Titles) Enactment 1972.*

The influence of STA and STA during the lifecycle of a strata scheme is presented in Figure 1. Generally, STA is more prominent during the matters and activities leading to the approval and issuance of strata titles, regulating strata title issuance procedure and title details. The application for strata titles, known as building and/or land subdivision, is now slotted to occur within 3 months of the completion of the super-structure stage. Section 9(2) STA clearly requires the land to be held under final title, the land use to not be contrary to the land category and conditions and for the land to be free of charge and lien. When approval is given by the Director of Lands and Mines ("PTG"), the Registrar will open the strata register and the MC will come into existence .

Figure 1: Strata property lifecycle and strata legislation

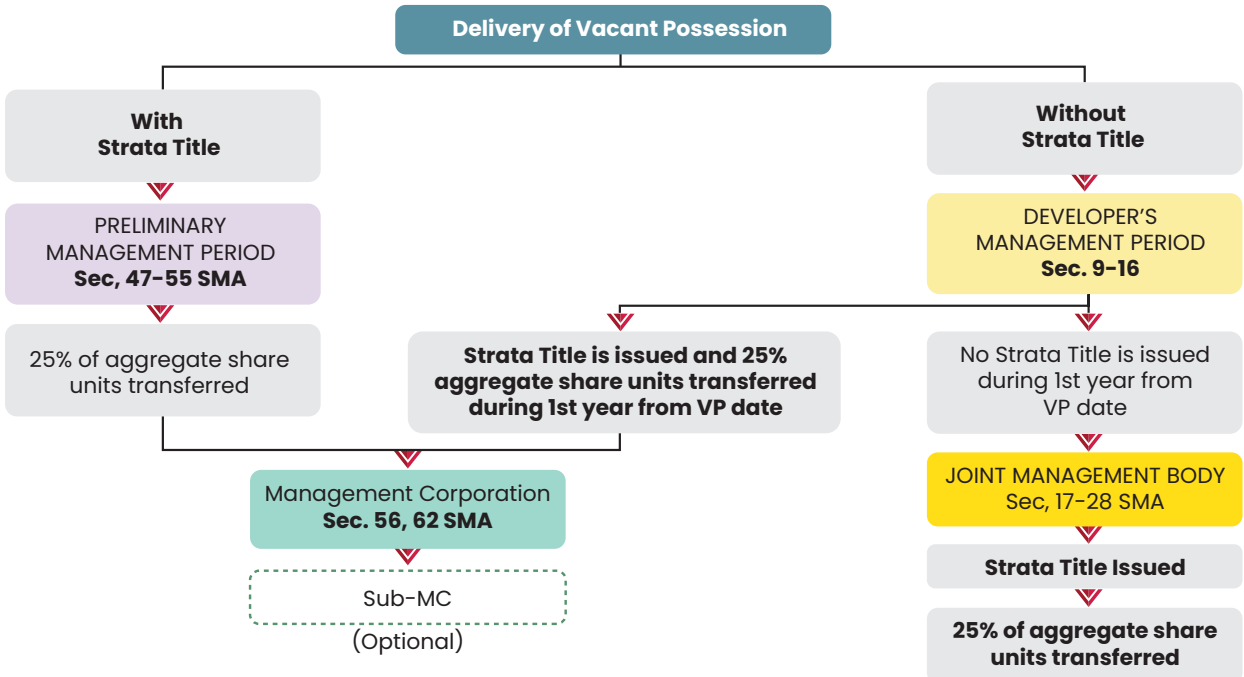


[2] Section 15 STA. [3] Section 17 STA. [4] Any part of the lot not comprising the parcel and accessory parcel, and used or capable of being used by two or more owners is known as the "common property".

Specific to new strata residence that falls within the definition of accommodation under the Housing and Development (Control and Licencing) Act 1966 ("HDA"), the developer has to observe all Section 7 HDA obligations and use the prescribed sale and purchase agreement (Schedule G), which among others stipulates that the completed strata accommodation must be delivered within 36 months of the sale and purchase agreement. The handover of completed strata units i.e. the delivery of vacant possession (DVP) to purchasers must be made together with the common facilities to facilitate enjoyment by the owners. It is at the point of DVP when SMA starts to operate, whereby the management and maintenance (M&M) of the common areas, building components and facilities begins. As reflected in Figure 2, DVP may occur with or without the issuance of strata title. In any case, the developer initially undertakes M&M, followed by either the Joint Management Body (JMB) or Management Corporation (MC). If DVP occurs without the issuance of strata titles, developer's M&M under Developer's Management Period will be followed by the JMB and subsequently the MC. The current aspiration per the amended STA is to have DVP with strata titles, with developer's M&M under Preliminary Management Period leading directly to MC. However, the first annual general meeting to form the Management Committee of the MC can only be held when strata title registrations by strata owners whose share units are at least one-quarter (25%) of the aggregate share units. The strata registrations process is achieved through POT, a conveyance that may incur a substantial sum of money comprising professional fees, stamp duties, registration fees, search fees and incidentals.

According to the current strata legislation, the proprietor is only obliged to maintain his parcel and accessory parcel, with the building and common property coming under the joint responsibility of all - or only by entitled proprietors in the case of limited common property (LCP). The latter is a concept introduced in SMA to allow for a more effective management of mixed strata development and equitable arrangement among proprietors. Upon the establishment of MC, proprietors in mixed strata development may opt to form Subsidiary Management Corporations (Sub-MCs) for the M&M of LCP by way of comprehensive resolution as stipulated by SMA.

Figure 2: Management body periods



[5] *Section 17A STA.* [6] *Item 2, Second Schedule SMA.*

The day-to-day M&M activities are undertaken by a committee – Joint Management Committee (JMC) under JMB period and Management Committee under MC period. The JMC and Management Committee shall comprise 3 to 14 members. An important aspect of proper M&M of strata development is having adequate funds to pay for the expenditure comprising maintenance charges and sinking fund contribution. Any surplus profit or revenue may also be distributed to the owners. Owners' rights and liabilities in a strata scheme are determined by their share in the development, a concept known as share units. Due to its importance, the calculation of share units must be approved and certified by the PTG via the Sijil Formula Unit Syer (SiFUS). Interestingly, the prescribed formula for the calculation of share units is contained in SMA's First Schedule rather than STA. In sum, the formula uses the basis of total parcel and accessory parcel area owned, adjusted using prescribed weightage factors according to type, air-conditioning, size and for accessory parcels, their location (indoor/outdoor). The share units are the basis of maintenance charges and sinking fund contributions by proprietors, or the developer in the case of unsold parcels. The collection of the charges and contributions is to be deposited into the maintenance account and sinking fund account accordingly.

3.0 PRACTICAL ISSUES IN STRATA MANAGEMENT

i. Mixed development woes

Although delay in strata title issuance is not a new issue, its implications have become more far-reaching under the new system of DVP with strata title especially for large mixed development. DVP without strata title will prolong the M&M under JMB as MC will only come into existence upon the opening of the strata register . As such, strata title delay will not only extend developer's involvement in the M&M but also hinder the formation of sub-MC. In mixed development, sub-MC can resolve inequity faced by commercial users who must bear the burden of paying for M&M of common property that they do not use, such as swimming pool, playground, etc., which effectively represents a cross subsidy for residential users.

The cross-subsidy effect is caused by the factoring calculation in First Schedule, SMA. Whilst the weightage factors already contain discount elements, in reality the resulting single rate may be onerous to certain users, especially for commercial users with large floor areas. As a solution, management bodies have been known to impose multiple rates to accommodate situations where the commercial component's maintenance charge invoice is significantly high. Nevertheless, the Federal Court decision in the landmark case of Menara Rajawali has reiterated SMA provision that the JMB can only a charge single rate of maintenance charges and MC can only vary the rate of maintenance charges in very limited circumstances.

ii. Gaps in monitoring

Per SMA, the developer shall open a maintenance account and a sinking fund account in respect of each development area with a bank or financial institution before the charges and contributions are collected from the purchaser. In the notice of vacant possession under HDA, the developer is entitled to charge for 4 months in advance of maintenance fees. The paid advanced maintenance fees may be vulnerable to misuse as there is yet a monitoring mechanism to ensure that all the moneys are deposited into the statutory maintenance account instead of a private account.

iii. Hidden costs

The intention of Act 1450 for the developer to give vacant possession with strata title can expedite the formation of MC and is therefore commendable. However, without the Perfection of Transfer (POT) by the purchasers, the strata title remains in the developer's name. Oftentimes, buyers who are unaware of the POT requirement as the last step in their property purchase may be upset with the "additional" costs and refuse to undertake the POT. This and other reasons may delay the POT, which means that the developer needs to keep the titles safely until POT is undertaken. Hence, some of the developers have started to collect storage fees from the purchasers for this service.

For buildings completed before June 2015 and without SiFUS, JMB must be proactive in collecting extra fund to appoint a Licensed Land Surveyor for the due process of SiFUS application required for building subdivision. This costly exercise can also turn difficult if the developer as the landowner no longer exists as the strata titles are required to be prepared in the name of the last proprietor of the lot.

iv. Encumbrance-free title

Under Section 9(2) STA, the processing of strata title application requires the land title to be free of encumbrances. As a result, the developer needs to redeem the land from all the charges by paying off all the bridging loan. In mixed commercial and residential development, the residential element is usually developed in the first or early phase to attract crowd to support the commercial development. Per HDA, the developer must deliver the strata residence within 36 months from the SPA date or pay the liquidated ascertained damages to the house buyer. As mentioned earlier, the current system requires strata title to be issued during DVP. As such, the developer must also apply for strata title during construction to coincide with DVP and must be prepared to pay off any loans that are related to charges on the title. In complying with Section 9(2), inexperienced developers may face cash flow issues that may adversely affect the remaining development.

v. Power dynamics

In a strata development, the unsold parcels and balance of the unbuilt units or provisional blocks still belong to the developer. Thus, the developer may hold the majority share unit in the development, which translates as having dominant authority in the M&M of the said development. Conversely, as the majority share unit holder, the developer also becomes the main payee for the maintenance charges and sinking fund contribution. If the amount is substantial, a potential issue is developer's refusal or non-ability to pay based on the rationale that they do not enjoy the facilities, therefore should not pay the same rate as the owners.

On the other hand, the MC formed by owners may use their legal authority to approve by laws that may impede the upcoming development phases using current occupants' safety and security as justification. Understandably, the construction work of the upcoming projects may give rise to nuisance and other issues to the existing owners; for instance, the heavy vehicles can cause damage to the existing infrastructure such as the access road that will be an extra expense to the MC.

vi. Handing over account from developer to JMB

The hand over process from developer to JMB is governed by Section 15 SMA whilst developer's hand over to MC is controlled by Section 55 SMA. The developer is required to transfer the balances in the maintenance and sinking fund accounts, administration office, audited accounts, assets, relevant records and invoices, all which will be used by the subsequent management body. During developer's period, the developer has the responsibility to collect the maintenance fees and exercise recovery of sums by attachment of movable property of the defaulter or file the claim for outstanding amounts to the Strata Management Tribunal. Nonetheless, there is no requirement for the developer to ensure that all outstanding payment by defaulters is settled before the hand over. When the default rate and outstanding amount are high, it is likely that the moneys brought forward from developer's management period are insufficient for proper M&M. As a result of not having enough money in hand, the JMB or MC may be less effective in the M&M of the building and common property.

vii. Strata scheme with less than three owners

SMA's Second Schedule provides for the situation whereby the number of proprietors is too small to form the conventional Management Committee, which normally constitutes at least the chairman, secretary and treasurer. A conventional management body is required, inter alia, to hold annual general meeting (AGM), open and maintain a maintenance account and a sinking fund account, and file the AGM minutes and audited accounts to the COB. For schemes with less than three proprietors, the Management Committee shall comprise all of the owners who must undertake the duties of the conventional Management Committee as there is no exemption clause under the current provisions for such duties. This means that in a scheme that only has two proprietors, these two owners will form the Management Committee of the scheme. Such arrangement is indeed impractical and unproductive to the owners.

A potential solution is having the Minister exempt such schemes from all or any of the provisions of this Act by order published in the Gazette, subject to terms and conditions. However, if full exemption is granted, the owners will not be entitled to resolve strata disputes at the Strata Management Tribunal. Therefore, the alternative is for the State Authority to suspend the operation of certain or all SMA provisions in the local authority area where the strata scheme is located so long as not contrary to the public interest and the interest of the purchasers to do so.

With reference to the Second Schedule of SMA, a strata scheme with a single proprietor will affect in the proprietor having the power of the Management Committee in making any decision. This provision comes into play in the Private Lease Scheme (PLS), a land arrangement where the proprietor grants a long-term lease on the land to a lessee, who then develops the land and sells the completed units, with the land to revert to the proprietor upon lease expiry. As such, the developer is just a lessee of the land and thus the buyers will never be issued with strata titles registered under their names. Therefore, neither the developer who is a lessee nor the parcel buyers have the right to be involved in the M&M under SMA.

viii. Termination of the subdivision

Old strata schemes are normally ripe for redevelopment as they are located in urban centres within Kuala Lumpur, Selangor, Pulau Pinang and Johor. To facilitate redevelopment, a strata scheme can be ended by termination of subdivision under Section 57 SMA. The decision to terminate is via unanimous resolution and is affected by submitting Form 8 and all the titles including strata titles and provisional blocks to the registrar. Section 2 SMA defines "unanimous resolution" as a resolution which is passed at 100% total voting at a general meeting of which at least 21-day notice specifying the proposed resolution has been given and carried by every valid vote cast either by a show of hands or a poll. However, a valid vote requires the proprietor to be free of maintenance and/or sinking fund arrears or any other moneys due seven days before the meeting date. With this rule, it will prevent the vote of any proprietor who fails to comply with the conditions. This also disqualifies a parcel buyer whose POT on the unit is still pending.

Therefore, getting a 100% consensus may be a tall order to achieve, especially in en bloc sales. In other countries with established strata regime, en bloc sales are often used in the redevelopment of old strata schemes. Essentially, en bloc sales entail selling the whole strata development to a single buyer. To facilitate it, the strata legal framework should provide for the possibility of not achieving 100% consensus as even one refusal would frustrate the deal. In other countries, a majority agreement instead of 100% consensus is required; it is 90% in Hong Kong, and 80% for buildings more than 10 years and 90% for buildings less than 10 years old in Singapore. Such flexibility allows room for negotiation and would boost en bloc sales in Malaysia.

ix. Short-term Accommodation (STA)

The management bodies are empowered under Sections 32(2), 32(3) and 58(2) of SMA to create additional by-laws restricting activity for the purpose of safety and security of the strata community, including short-term accommodation (STA) via online platforms such as Airbnb, booking.com, agoda.com or other similar set-ups. The operation of STA has raised concern among the residents regarding their well-being, especially when the guests have misused the common facilities, damaged the common property and caused nuisance to the residents, in some cases even incurring substantial repair costs on the management body. The Federal Court decision in Innab Salil & Ors vs Verve Suites Mont' Kiara Management Corp (2020) has created widespread legal implications for many who are renting strata units out as STA as a business venture. It establishes a legal precedent allowing MC and JMB to ban short-term rentals based on their own house rules. Investors who are currently operating or planning to operate their strata homes as an STA should be wary of the legal risk should such by-laws are passed.

Nevertheless, the online STA operators are not licensed by the local authority and are not subject to sanctions covering conventional hospitality businesses. Being literally unregulated, it is business as usual for these online STA operators and errant strata unit owners may still use the online platform service to rent out their units. Thus, strata schemes without STA-banning house rules are still prone to the abovementioned issues related to short-term paying guests

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4.0 CONCLUSION

The issues highlighted above indicate complications in reconciling current practice in the industry with the present legal framework due to the existence of grey areas and lacunas in strata legislation. The court has played an invaluable role in interpreting STA and SMA, thus providing additional guidance to stakeholders. Whilst it is impractical for frequent amendments to be undertaken, the prevalence of some issues and their considerable implications warrant a more meticulous analysis of the shortcomings contained in the current strata legal framework and of its interpretation and implementation. Disparate interpretations and implementations of STA and SMA are still rampant in practice despite the established and well-settled legal principles that have guided the courts. The rapid progress in property development, with many new strata schemes looking for ideas from outside the country has led to new concepts to be adopted in Malaysia by innovative developers. An example is the PLS, which the pioneering developers should have adapted to suit the existing legal framework of this country, avoiding the legal quandaries which later arose. The authorities especially the local governments, together with professional organisations such as RISM and NGOs such HBA and REHDA have strived to close the knowledge gap among the stakeholders by holding seminars and workshops, and publishing articles in mainstream media. It is up to the stakeholders – developer, management bodies, surveyors, policymakers, strata law administrators, buyers and proprietors – to update and upgrade their knowledge in the strata legal framework.

Perhaps, a more long-term solution should be explored. If the previous disharmony in land administration has been resolved by establishing a national land institute (Institut Tanah Negara or INSTUN), could it be time to set up INSTRAN (Institut Strata Negara) to train strata administrators as the first step towards harmonising strata practice in the country?

The Influence of Behavioral Biases in Real Estate Investment for Institutional Investors

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ABSTRACT

Institutional investors play a significant role in the investment market which includes real estate and the capital market. Evidence has shown that in capital market investments, institutional investors' decision making has been influenced by bias factors which have resulted in volatility that distorts market stability. Behavioural finance demonstrates investors' heavy reliance on the heuristics approach especially when making decision making under uncertainty. The objective of this paper is to examine the factors and determinants of behavioural biases that influence real estate investment for institutional investors. With the review, several important empirical research related to behavioural real estate investment. Having identified the factors of behavioural biases that are related to institutional investors' real estate investment namely Prospect theory and Heuristic Behaviour, a conceptual framework is proposed.

Keywords: Real Estate Investment, Institutional Investors, Behavioural Finance, Behavioural Biases

1.0 INTRODUCTION

Real estate is one of the asset classes that are included in any investment portfolio. It is one of the sought-after investments due to the following advantages strong risk-adjusted return, diversification, and inflation hedging (Andrew E. Baum, Neil Crosby, & Devaney., 2021). Investors in real estate can either be individual or institutional. Institutional investors are defined as asset management companies such as investment funds, insurance companies, pension funds and other forms of institutional savings that principally work for their customers as agents (Suto & Toshino, 2005). The role of an institutional investor includes managing and allocating funds, designing investment policies and strategies, awarding investment mandates and monitoring investment activities.

Real estate has shown to be a major class of asset for institutional investors, the major focus would be to understand these investors from behavioural perspectives. It has been observed that research on behavioural finance started in the 1980s, with a focus on identifying behavioural decision-making attributes that are likely to have systematic effects on financial market behavioural (Olsen, 1998). Institutional investors vary depending on the nature of their business and organization. Different investors will have different attitudes towards the investment's objective and strategy. Evidence has shown that in capital market investments, institutional investors' decision making was influenced by bias factors which resulted in volatility that distort market stability (Ahmad, Ibrahim, & Tuyon, 2017a).

The study of institutional investors' behaviour in real estate is very limited. Wang, Hou, and He (2017) studied on the dynamic link between real estate prices and firms' investment behaviour in China. Furthermore, Hellman (2000) covered Swedish institutional investors on equity market decision

making. It is vital to understand institutional investor behaviour as it can determine the asset prices and consequently the market behaviour (Ahmad, Ibrahim, & Tuyon, 2017b). Thus, this paper attempts to examine the factors and determinants of behavioural biases that influence the real estate investment for the institutional investors.

2.0 REAL ESTATE INVESTMENT

Investment involves the sacrifice of something now for the prospect of future benefits (Phillip T. Kolbe. Gaylon E. Greer, 2013). Property investment generates returns in both ways which are by generating a flow of income and by generating a return on capital (Andrew E. Baum et al., 2021). In addition, real estate also has strong risk-adjusted return, diversification, and inflation hedging (Andrew E. Baum & Hartzell, 2020).

Stephen E. Hargitay (1993) indicates real estate investment have been traditionally regarded more as an art than a science, where investors, decision-makers and analyst rely more on their experience, subjective judgement, and gut-feeling rather than objective, quantified evidence, and sophisticated analytical procedures. The author then added, investments are made based on investors belief, or expect, to happen in the future. Hence, subjectively can never be eliminated from the investment decision-making process, a rational approach to the formulation of investment strategies is essential. In practice, the processes of investment decision-making are often irrational and riddled with inconsistencies. This paper will review on the behavioral biases factors and determinants that influence the real estate investment for the institutional investors.

3.0 INSTITUTIONAL INVESTORS

Institutional investors are companies that manage a pool of assets such as investment funds, insurance companies, pension funds and other forms of institutional savings that principally work for their customers as their agents (Suto & Toshino, 2005). Institutional investors are recognised as an influential force worldwide because of their large shareholdings and ownership of public equity. As stated by Ahmad et al. (2017b) institutional investors are the main actors in the financial market. Therefore, their investment and shareholding practices can give an impact on the overall economy and society. The largest global real estate investors are pension funds, insurance companies and sovereign wealth funds (Andrew E. Baum et al., 2021). The total capital raised by institutional investors in Asia Pacific on real estate funds is US$39.7 billion in 2022 (CBRE, 2023). Although the institutional real estate investment is significant in size, it is inadequately explored in the literature (Liu, Mauck, & Price, 2019).

According to E. Philip Davis and Steil (2001) the definitions on institutional investors are not uniform due to the objectives and institutional constraints on fund management that are different from one country to another country. Boubakri and Cosset (2011) in their book, categorised the institutional investors to investment companies, mutual funds, pension funds, foundations, sovereign wealth funds (SWFs), insurance companies and investment banks. Meanwhile Ignazio Basile (2016) categorised the institutional investors in European Union countries as Collective investment vehicle (CIVs), individual portfolio management, insurance companies, pension funds, institutions for occupational or personal retirement provision and foundations and endowment. The summary of institutional investor categorisation is shown in Table 1.

Table 1: Categories of Institutional Investors

Sovereign Wealth Funds (SWFs)	These state-owned investment funds manage surplus funds typically derived from natural resources, trade surpluses, or government reserves. Sovereign wealth funds aim to preserve and grow wealth over the long term, often investing globally across various asset classes.
Mutual Funds	Mutual funds pool money from individual investors to invest in a diversified portfolio of securities, such as stocks, bonds, and money market instruments. They are managed by professional fund managers and offer investors the opportunity to access a diversified investment portfolio.
Hedge Funds and Private Equity Funds	These alternative investment vehicles pool capital from institutional and high-net-worth investors to invest in a range of assets. Hedge funds employ various investment strategies and often seek higher returns through active management. In contrast, private equity funds invest in privately held companies to acquire, restructure, and sell them for profit.
Insurance companies	Insurance companies collect premiums from policyholders and invest the funds to generate returns that can be used to pay out claims and meet policyholder obligations. These institutional investors typically invest in a range of assets, including equities, bonds, real estate, and alternative investments.
Pension Funds	A pension fund is an asset pool that exclusively finances pension plan benefits. These are funds established by employers, labour unions, or governments to provide retirement benefits to employees. Pension funds manage and invest the contributions made by employees during their working years to ensure a source of income during retirement.
Investment Banks and Asset Management Firms	These institutions manage and invest on behalf of their clients, which may include corporations, institutional investors, and high-net-worth individuals. They offer a variety of investment products and services, such as portfolio management, advisory services, and alternative investments.
Foundations and Endowments	Endowment are funds established by educational institutions, non-profit organizations, or foundations to support their long-term financial goals. These funds are typically invested to generate income that can be used to fund scholarships, research or other initiatives.

Source: Adopted and adapted from: Ignazio Basile (2016)

4.0 BEHAVIOURAL FINANCE AND BEHAVIOURAL BIASES

Behavioural finance demonstrates investors' heavily reliance on heuristics especially when making decision making under uncertainty. Heuristic is referring to cognitive shortcut that help to reduce complex decision-making process into simpler ones. Heuristics leads to the influence of the inherent biases in humans, resulting in flawed decision-making. Behavioural biases is the collective term used to describe these irrational biases that unconsciously influence the decision-making process.

Bakar and Yi (2016) explain that behavioral finance considers how various psychological traits affect how individuals or groups of investors. Thus, this study area attempts to understand how emotions and cognitive errors influence the behaviors of individual or groups of investors. Behavioral finance also seeks to explain why and how investors can act beyond the boundary of rationality in ways that oppose to what they are supposed to. Behavioral finance is a study that deals with investor's psychology and its role in making financial decisions. This field provides an alternative explanation of market behavior where traditional finance theories unable to explain. Hence, this field explains that real investors are influenced by their psychological biases.

5.0 PREVIOUS STUDIES ON INSTITUTIONAL INVESTORS' BEHAVIOURAL BIASES

Studies on institutional investors' behavioural biases in decision making have captured the attention of academia worldwide. Article by Aren, Aydemir, and Şehitoğlu (2016) is the first to review the research related to behavioural biases displayed by institutional investors. They indicate that although the volume of research in this area is increasing, however, the current in- depth review in this area is still inadequate. The researchers explore and evaluate the home bias, disposition effect and herding behaviour of institutional investors in recognised journals.

Meanwhile, Lowies, Hall, and Cloete (2016) studied the behavioural biases among the listed property fund managers in South Africa. Their research aimed to determine whether anchoring and adjustment as heuristic-driven bias and herding behaviour influence listed property fund managers in South Africa's property investment decisions. A questionnaire survey was distributed via e-mail to the targeted respondents. Their findings are consistent with other studies that suggested anchoring and adjustment existed in the decisions made by listed property fund managers. However, fund managers tend to not adjust to new information due to the current socio-political environment in South Africa rather than a lack of understanding of the new information.

Hence, Ahmad et al. (2017b) review the theory and empirical evidence of institutional investors' behavioural biases from thirty (30) selected papers from nineteen (19) countries. Among the behavioural biases highlighted by the authors are heuristics approaches comprises of anchoring, availability, confirmation, disposition effect, gambler's fallacy, hot hand fallacy, loss aversion, mental accounting, over optimism, overconfidence, and representativeness. The authors also highlighted the affected state of behavioural bias which are emotions, sentiment, mood, and thus the social forces of behavioural bias which include herding, social influence and norms. Among the theories underlined by Ahmad et al. (2017b) are bounded rationality theory, prospect theory, agency theory and corporate governance theory.

Ahmad et al. (2017a) further conducted a survey towards fund managers in Malaysia. The aim of their study is to explore the relevance of bounded rationality to the practice of institutional investors in Malaysia. Hence, understanding institutional investor behaviour is important, as it can determine asset prices and consequently market behaviour. From the one hundred (100) open-ended questionnaires distributed to selected registered fund manager in Malaysia via postage, only thirty (30) questionnaires were returned and analysed. The findings revealed the institutional investors are prone to behave in a boundedly rational manner as postulated in the bounded rational theory. The authors indicate that awareness of the bounded rational of investors and the behavioural biases arising out of the irrational part of investor thinking provides a rational theoretical justification for the adaptive efficient financial markets.

Ogunlusi and Obademi (2019) examined the impact of behavioural finance on investment decision at the investment bank in Nigeria. The study distributed two hundred (200) questionnaires to the bank clients to assess the heuristic biases in investment decision. The result showed the overall significant impact of behavioural finance on investment decision. This study was able to provide evidence that heuristics and prospect theories dimensions had many times influenced investors while making investment decisions. These cognitive mistakes have the tendency to undermine the whole investment process and objectives if not immediately arrested.

Another study in behavioural finance is by Kinatta, Kaawaase, Munene, Nkote, and Nkundabanyanga (2021). They examined the relationship between investor cognitive bias, investor intuitive attributes and investment decision quality in commercial real estate in Uganda. The study used cross sectional analysis by distributing a structured questionnaire survey to three hundred and eighty four (384) real estate investors and developers. The results indicate that investor cognitive bias and investor intuitive attributes are positive and of significant determinants of investment decision quality in commercial real estate.

A recent study by Owusu and Laryea (2022) explored how anchoring affects the dynamics of investor decision- making regarding mutual funds and how this bias differs amongst gender and level of financial knowledge among the mutual fund investors in Ghana. The findings show that, overall, investors were prone to be significantly influenced by the anchoring bias. The study also finds a strong, albeit not significant, the association between participants' susceptibility to anchor and both gender and the level of financial knowledge of participants.

6.0 FACTORS AND DETERMINANTS OF BEHAVIOURAL BIASES IN REAL ESTATE INVESTMENT

Institutional investors, like individual investors, can be subjected to various behavioural biases that may influence their decision-making process. The common behavioural biases among institutional investors are explained in the following discussion.

i. Anchoring refers to making decisions based on some benchmarks or reference points. Anchoring effect occurs whenever people consider a particular value of an unknown quantity before estimating the quantity, thus as a result, the estimate stays close to the number considered, referred to the "anchor". The anchor could be an asset's previous price or performance or some other reference item which leads to overreactions or underreactions by investors. Anchoring has also been associated with preference reversals, traits inference, egocentric biases, and illusions of transparency. Owusu and Laryea (2022) explains the anchoring bias occur when the investors are making decisions and they tend to rely heavily on existing opinions or information, thus disregarding new information. It has to be noted that anchoring may not always be negative or irrational, however wrong estimates from anchors could be problematics.

Da Silva, Matsushita, Pereira, and Fontana (2019) interviews and conducted a controlled experiments on selected real estate agents to study on the anchoring effects in real estate markets. They found anchoring behaviour in real estate agents judgement. A recent study by Owusu and Laryea (2022) explores how anchoring affects the dynamics of investor decision- making regarding mutual funds and how this bias differs amongst gender and level of financial knowledge among the mutual fund investors in Ghana. The findings show that, overall, investors were prone to be significantly influenced by the anchoring bias. The study also finds a strong, albeit not significant, the association between participants' susceptibility to anchor and both gender and the level of financial knowledge of participants.

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not adjust to new information due to the current socio-political environment in South Africa rather than a lack of understanding of the new information.

ii. HOME BIAS

Home bias is one of the most studied bias regarding behavioural biases of institutional investors (Aren et al., 2016). Home bias is recognized as a tendency of investors to greatly choose the instruments of their home country or locally without any justification and it has been enormously sought out in behavioural finance literature. Gaar, Scherer, and Schiereck (2020) describes home bias as an investment behaviour in portfolio management where investors tend to overweight their home country's market and hence investing disproportionally more in assets of their home country compared to its share in the overall market portfolio. The investors are prone to invest in their home or local market is because of common language, cultural familiarity, and the knowledge of the local markets. The literature also include political impression, corporate governance, social environment and advisory facilities into the elements that influence the home bias.

iii. HERDING BEHAVIOUR

Herding behaviour is referring to the tendency of investors to behave similar by pursuing each other's behaviour (Aren et al., 2016). Herding is usually interpreted as the tendency of investors to behave in a similar or coordinated manner (Lantushenko & Nelling, 2017). Thus this behaviour may arise due to investors reacting to common information, reputational concerns by portfolio managers, or positive feedbacks trading. Hence, from the behavioural perspective, researchers attribute herding to the collective irrationality of investors, which can result in the mispricing of economic fundamentals.

Suto and Toshino (2005) explore herding behaviour on institutional investors in Japan. They found that, in general all institutional investors exhibit herding behaviour. The underlying reasons for displaying this behaviour is because institutional investors are utilizing the same published information, protecting their reputation and showing risk aversion behaviour. Lantushenko and Nelling (2017) examines whether institutional investors exhibit herding behaviour by property type in real estate investment trusts (REITs). They found that institutional investors exhibit herding behaviour in REITs property types.

iv. OVERCONFIDENCE

According to behavioural decision theory, overconfidence is a psychological bias that provokes decision-makers to exaggerate their problem-solving skills (Ali & Tauni, 2021). Institutional investors are influenced by overconfidence bias due to their expertise and access to resources, may become overconfident in their abilities to predict market movements and make successful investment decisions. This bias can lead to excessive risk-taking and poor portfolio diversification.

Overconfidence can be manifested through over precision, overestimation, over placement and overoptimism. Ali and Tauni (2021) then added, over precision refers to overstating the accuracy of forecasts and information. Overestimation occur when decision-makers overvalue their capabilities and demonstrate the illusion of control even in those situations where the probability of occurrence is very low. Whereas over placement refers to the perception of being superior to others. Overoptimism refers to the tendency of being overly optimistic about future scenarios and undervaluing the possibility of occurrence of bad incidents.

v. REPRESENTATIVE AND FAMILIARITY

Representative and familiarity occurs when brain uses shortcut to reduce the complexity of analysing information. The behaviourist refer this process as heuristic simplifications. Due to this biases, it is hard for investors to analyse new information correctly and thus can lead to inaccurate conclusions.

vi. LOSS AVERSION

Loss Aversion was introduced by Kahneman and Tversky in 1979. It is referring to the tendency of individual/ organization to avoid losses strongly as compared to gains. This is because inventors are more distressed at the view of losses than corresponding gains. Institutional investors may be more averse to losses than focused on potential gains. This bias can lead to a reluctance to sell losing investments and a tendency to hold onto them in the hope of a rebound, which can result in suboptimal portfolio management. Hossain and Siddiqua (2022) conducted a study on behavioural influences on the Dhaka Stock Exchange (DSE). The result shows that risk aversion and risk perception are two most influential emotional dimensions that impact investors' decision.

vii. FRAMING

Framing is a type of cognitive bias wherein investors react differently to a given situation depending upon the way it is presented, that is, loss or gain. The framing bias influences the manner in which financial planner presents their product or service to client. Dobson and Poels (2020) studies framing effects on consumers' mortgage decision-making, thus they found that framing does exist in the mortgage marketing. They highlighted on the effects of advertising a long-term mortgage on behavioural intention were more favourable than those of advertising a short-term mortgage.

viii. DISPOSITION EFFECT

Disposition effect is defined as the tendency of selling assets which are already increasing in value sooner and of holding those whose prices are decreasing. Literature indicates that disposition effect would not appear on institutional investors due to their experiences and overconfidence behaviours. However, there is one study by Menkhoff, Schmeling, and Schmidt (2009) discussed both home bias and disposition effect.

Having reviewed the various factors and determinants, a conceptual framework is illustrated in Figure 1 that shows the factors and determinants of behavioural biases in real estate investment decision-making.

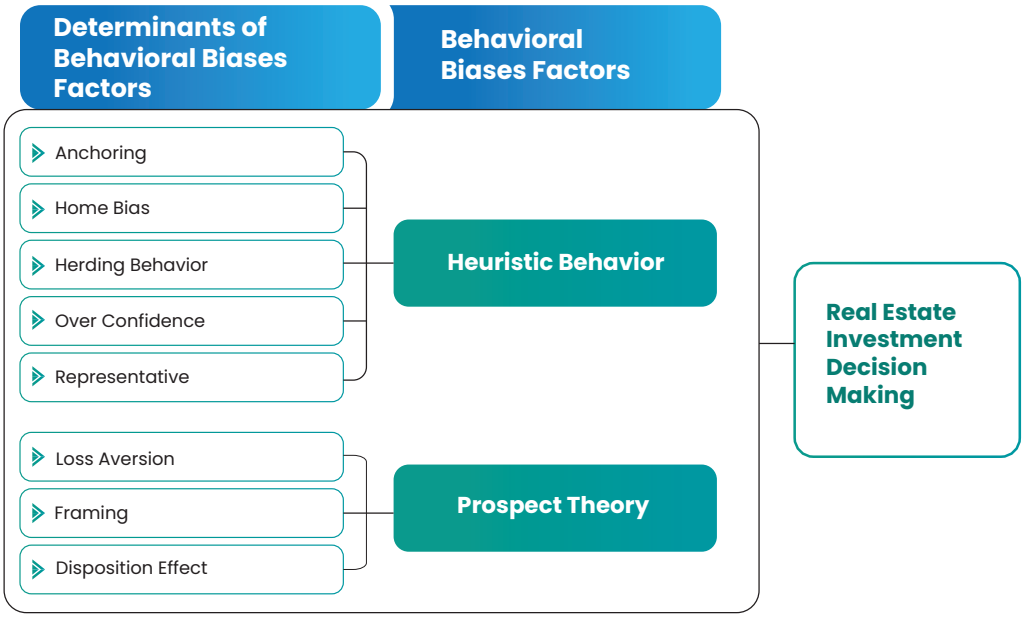

Figure 1: The Conceptual Framework of Behavioural Biases and Real Estate Investment Decision-Making

It's important for institutional investors to be aware of these biases and employ strategies such as thorough research, diversification, and independent analysis to mitigate their impact and make more rational investment decisions.

7.0 CONCLUSION

Based on the above discussion, it is observed that the research on behavioural biases and real estate investment decision-making among institutional investors in Malaysia is limited. Therefore, it is important to understand the real estate decision-making process as it provides the ability to explain factors that lead to irrational decisions by institutional investors. Knowing these factors can help in assisting them with their decision making and strategies in an uncertain investment world. It also contributes in the explanation of the effects of behavioural factors that could change the institutional investor decision making. Understanding the institutional arrangements that underpin property investment helps corporate investment managers to understand the influence of behavioral bias toward real estate investment decision-making.

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A Study on Electronic Energy Benchmarking (Eebs) for Religious Building towards in Sustainability Energy Management

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Keywords

Energy Audit,
Energy Performance,
Energy Consumption,
phJKR.

ABSTRACT

Mosques are buildings with a unique occupancy and particular energy consumption scheme. Generally, this type of building lacks the application of energy efficiency solutions and sustainable guidelines during conception, construction, and operation. A detailed discussion about performing three (3) main objectives which are to identify energy consumption and sustainability in the building, to investigate energy consumption and sustainability performance in the building, and determine the relationship between energy consumption and sustainability in the building. Next, the aim of this research work is to establish the significant intersection between energy consumption and sustainability assessment tools. This research is combination of secondary and primary method that has been employed to carry out this research. By collecting the data from management team and thus to identify the importance of energy consumption development, current practices, methods and relationship between energy usage in the selected building with sustainability assessment tools that being created from the government sector which is 'penarafan hijau Jabatan Kerja Raya' (phJKR) document.

1.0 INTRODUCTION

Energy consumption has increased in recent years due to growing demand as an essential prerequisite for economic growth. Malaysia, a rapidly developing country, exhibits the same pattern of energy usage. Malaysia also is well out of Asia as a tropical country with hot and humid weather. Eventually, daylight hours begin about 7 a.m. and last until 6 p.m. Malaysia's climate is distinguished by constant temperature, plentiful rainfall, and high humidity. The contextual design will take into account the site's distinct climate circumstances. All factors of the bio-climatic factor, such as climate change, building orientation and others, ought to be studied to apply to the design as one of the most effective ways to reduce energy consumption mostly by the religious building which is mosque (Asikin et al.,2015). Malaysia is one of Asia's Muslim communities, and as the Muslim population expands, mosques expand in tandem to meet the worshipers' demands. One of the significant considerations for mosque architecture and management is having appropriate energy efficient measures to ensure a comfortable environment for Muslims while having a low influence on the surrounding environment. Inadequate energy management will result in a low-temperature setting for the worshipers within the mosque (Asikin et al.,2015).

Given that the majority of research has concentrated on energy efficiency methods at the design stage, the research paper examines and evaluate successful techniques in order to establish a clear picture of energy consumption in religious buildings, with an emphasis on relationship of energy consumption in yearly with the sustainability assessment tools. Malaysia's energy demand is predicted to rise considerably as the country transitions from developing to a

developed. Energy efficiency is a critical aspect in advancing sustainable energy development and mitigating the energy sector's environmental effect. Malaysia's government recognizes the value and relevance of energy efficiency in the country and has implemented a number of action plans and steps to achieve economic, energy and environmental sustainability. The climate is also a significant influence in excessive air-conditioner consumption, as daily temperatures can approach 32oC during the dry season. Yet, various additional factors contribute to high energy use, including lights, appliances and inefficient equipment (M.N.M., 2019). However, the energy monitoring capabilities not directly related to the sustainability assessment tools. As a result, the energy monitoring system operates independently of the green building certification process. Consequently, this imposes a challenge to building owners who have to use several separate tools to do benchmarking. To tackle the challenge, the research attempts to bridge the gap between energy monitoring systems with the green building rating tools in Malaysia by identifying an Electronic Energy Benchmarking Systems (e-EBS) for religious building.

1.1 ENERGY CONSUMPTION IN MALAYSIA

In January 2002, Suruhanjaya Tenaga is responsible for regulating the Malaysian energy sector to ensure a sound electricity and an upright supply of gas at realistic costs for all sectors such as industries, commerce, transport, communications and the residential sector which began operational. Malaysia, which had been reliant on oil and gas-fired power plants for half a century, recognized the need of implementing renewable energy as a substitute for non-renewable conventional energy sources and is constantly reviewing its energy policy to ensure sustainable energy supply and assurance. The rapid depletion of non-renewable fossil fuel energy resources, which has a negative impact on the environment has also increased awareness for more sustainable energy efficiency measures that promote the use of renewable energy resources, reduce demand for energy development and contribute to positive economic, social, and environmental development (Asra et al., 2018).

Although Malaysia implementing many sustainable energy efficiency, energy conservation, and renewable energy measures, the annual increase rate of power consumption during the same period is below 10% while the GDP annual growth rate is lower 6%. The critical problems of Malaysia's power industry include sustainability, security and dependability of energy resources from energy supplies which is a combination of non-renewable and renewable energy, which are critical concerns for Malaysia's power industry for long-term sustainable growth. Today's society is more cautious, and Green Technology application is seen as one of the rational alternatives embraced by many governments to solve energy and environmental challenges concurrently. Green technology is a technology that helps us to advance more quickly while minimizing the negative influence on the environment. As a result, Malaysia must begin encouraging alternative energy to reduce its reliance on fossil fuel production (Asra et al., 2018).

1.2 ENERGY EFFICIENCY IN BUILDING

Energy efficiency in the building sector is described as consuming the minimum number of resources necessary to provide the more significant amount of essential service, including heating, cooling, and lighting, while sustaining comfortable circumstances. Energy efficiency in a building refers to all components within the building envelope, for example the door, window, roof with insulation and wall. Each of these components has a substantial impact on the overall conservation of energy resources. Energy conservation in buildings is well-defined by Al-Mofleh et.al., 2007 as broad category of actions that contains the whole thing from minimising energy consumption for HVAC systems, cooling, lighting as well as heating to obtain energy efficient equipment.

According to the research, there are three major factors that impact a building's energy performance, which are as follows:

- The design of the building consists of the shape, features, location and orientation.
- Service design of the building, which includes the HVAC system, cooling, heating, ventilation and lighting.
- Occupancy behaviour which is consists of the awareness of the occupants.
- Below are the following activities that must be engaged to increase the efficiency of the building services:
- Conducting energy audits on a regular and recurring basis to guarantee that the service system is running efficiently.
- Capitalize on the use of daylight to exchange the artificial light during the daytime.
- Installing the equipment of energy saving in the buildings.
- By using the appropriate insulation for the floor, wall, roof as well as high-performance glazing.

1.3 THERMAL COMFORT AND ENERGY PERFORMANCE IN MOSQUE

The research that began in 1998 and also was completed in 2003 evaluated the various sizes of 20 mosque structures in hot, dry areas of Saudi Arabia, 19 of which were considered air-conditioned mosques, and one of which used a passive and evaporative cooling system by employing wind catchers. The study's goal was to look into the effect of exterior weather and temperature (Tout) on the energy use of chosen mosque buildings in the shadow of employing various types of air-conditioning systems, for examples; wind catchers, units of windows, unit of centrals and unit of chilled water. Plus, the researcher collected the electricity bills for the selected mosques as well as the assessment methods such as interviews with the management teams, direct observation on the site, give questionnaire survey, and also the researcher collected for secondary data in literature review. According to the findings of the study, all of the air-conditioned mosque structures, regardless of size, consumed important energy when the (Tout) increased, in contrast to the one that used an inactive cooling system of wind towers. In light of the foregoing, it is revealed that mosques in hot arid and hot humid weather were researched more thoroughly than mosques in other types of weathers. Additional variables including elements that can influence the level of tolerable thermal comfort experienced by human beings and consequently, their energy consumption have been disregarded by previous researchers (Younness et al., 2020).

1.4 MOSQUE ENERGY AUDIT

Mosque energy audit is a critical procedure for determining including the qualifying energy and cost of reductions that can be attained in energy conservation solutions. It has been established a systematic methodology to energy auditing mosques in order to provide a precise and practical analysis of energy usage with energy consumption. The methodology delivers a stage process technique that evaluates the complexity of mosque characteristics, the uniqueness of mosque architecture as well as the types as well as operating of energy usage. A unique energy audit form was created to capture essential information from mosques during the site observation. A total of nine major categories were created from the information gathered for each mosque, which included general information, the surrounding area, mosque physical data, zoning, construction information such like windows specification, lighting systems, climate control systems, air circulation systems, hot water, cooling and so on (Abdou et al., 2005).

1.5 APPLICATION OF PHJKR

Rating systems have been introduced by various public and private companies worldwide which have consistent guidelines, rules, and statutory regulations that can quantify sustainability. Many agencies, in particular public infrastructure authorities, have supported and implemented their rating systems that are suitable for use by their organisations. The Public Works Department (JKR, Malaysia) is also involved in this effort. In this project, the tools being used is Penarafan Hijau Jabatan Kerja Raya (phJKR). JKR is one of the Ministry of Public Works of Malaysia's departments responsible for road, school, hospital and government buildings/infrastructure and execution on behalf of the Government. The JKR Strategic Framework 2016-2020 was developed, describing five strategic themes which included the Theme 4 – Sustainability Leading (Adzar et al., 2019). The Malaysian Public Work Department (PWD) has developed Penarafan Hijau JKR tool (phJKR), where phJKR is a measuring instrument to evaluate the sustainable level of government development projects (Jabatan Kerja Raya, 2015).

This objectives of the establishment of this tool are:

- To reduce the use of raw materials
- To reduce the use of fossil fuels
- To reduce the energy usage
- To reduce the water consumption
- To control the greenhouse gas emission
- To reduce the air pollution
- To lessen the solid waste
- To reduce carbon footprint

3.0 METHODOLOGY & DATA COLLECTION

Data collection can be categorised into two sections of data which is primary and secondary data. Figure 1 below shows the types of method used to collect data for this research. Mixed method approach was selected in conduction of this research and analysing the data collected. The purpose of applying the mixed methods is to expand the data in findings and analysis that can be found in research and contribute to the published literature. In general, mixed-method could contribute, and at the end, it will lead to conduct the related topic of this research (Johnson, 2017).

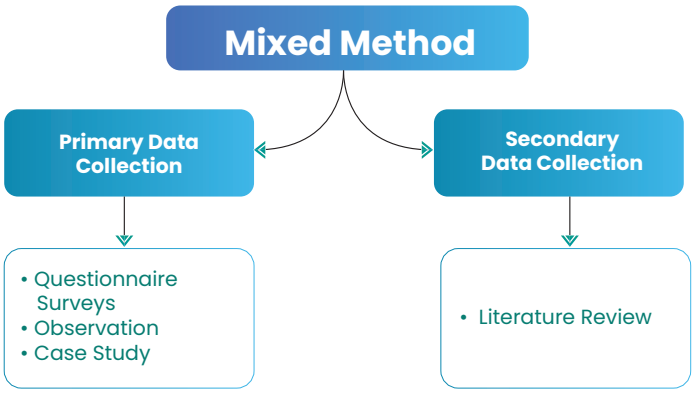

Figure 1 Method of Data Collection

3.1 QUESTIONNAIRE SURVEY

In this research, questionnaire surveys were employed to collect data regarding the usage of energy consumption and the satisfaction of energy consumption toward the building selected. The respondents are the building occupants, which are the mosque community and the management team. In the questionnaire, both structured and open-ended questions were used. Table 1 below shows the questionnaire structure, which consists of four (4) parts.

Table 1 The structure of questionnaire survey

Section	Details
A	**Demography** - General questions on the profile of the respondents in terms of gender, ages, job title are to be asked
B	**Effective Energy Benchmarking in the building selected toward sustainability energy management** - Respondents are asked to evaluate the effectiveness of the current practices of energy management towards the building and satisfaction levels toward the energy efficiency of the building
C	**Issues & Challenges** - This section, respondents will be asked on the issues and challenges to conducting energy management by using energy benchmarking tools in the building
D	**Recommendation & Suggestion** - This section consists of an open-ended question regarding the recommendation for the improvement of energy consumption within the selected building based on the occupants' perception

3.2 DIRECT OBSERVATION

Direct observation was conducted as one of the methods for collecting the data. Observation of the buildings is to complement and reflect the respondents' actual behaviour in the questionnaire survey. Moreover, by conducting the direct observation, the researchers are able to establish a better and more precise understanding of appropriate recommendations.

4.0 DATA ANALYSIS AND RESULTS

Statistical method was chosen to analyse the data collected through the questionnaire survey, energy audit, Pearson correlation of energy consumption and Penarafan Hijau Jabatan Kerja Raya (phJKR) and last but not least, the one-sample T-Test for correlation of the main items (ACMV, Lighting, Plug Load).

4.1 PEARSON CORRELATION ANALYSIS

In this analysis, the analysis of results elaborated the Pearson Correlation between three primary items, ACMV, Plug Loads and Lighting. Table 2 below illustrates the data of electricity bills for air-conditioning mechanical ventilation, lighting and plug loads.

Table 2 The electricity bills that breakdown down monthly

Month	Energy Consumption (kWh)	ACMV (kWh)	Lighting (kWh)	Plug Loads (kWh)
January	12552.00	7105	4026	1421
February	9607.00	4071	3944	1592
March	9533.00	4090	3953	1490
April	8303.00	3659	3506	1138
May	12294.00	5553	4863	1878
June	9659.00	4169	3985	1505
July	9088.73	3660	3940	1489
August	6019.27	4549	225	1245
September	8217.00	4188	2729	1300
October	7507.00	4087	2409	1011
November	7723.00	4119	2628	976
December	7792.00	4112	2887	963

A Pearson correlation requires that the relationship between each pair of variables is linear (Conover & Iman, 1981). This assumption is violated if there is curvature among the points on the scatterplot between any pair of variables. Figure 2 presents the scatterplots of the correlations. A regression line has been added to assist the interpretation.

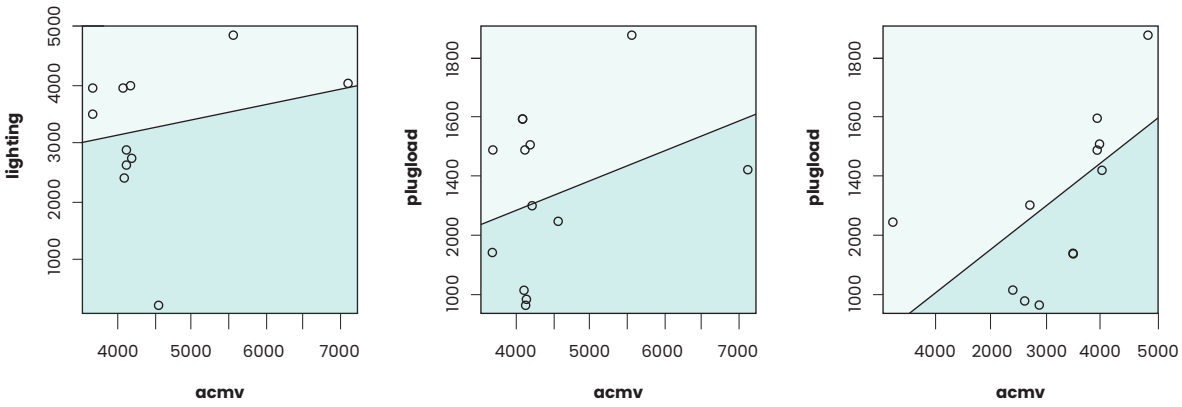

Figure 2 Scatterplots of the correlations (Scatterplots between each variable with the regression line added)

The result of the correlations was examined using Holm corrections to adjust for multiple comparisons based on an alpha value of 0.05. A significant positive correlation was observed between lighting and plug load (rp = 0.63, p = .029, 95% CI [0.09, 0.88]). The correlation coefficient between lighting and plug load was 0.63, indicating a large effect size. This correlation indicates that as lighting increases, plug load tends to increase. No other significant correlations were found. Table 2 presents the results of the correlations.

Table 2 Pearson Correlation Results Among acmv, lighting, and plug load

Combination	r_p	95% CI	p
acmv-lighting	0.22	[-0.40, 0.71]	.488
acmv-plug load	0.34	[-0.29, 0.77]	.276
lighting-plug load	0.63	[0.09, 0.88]	.029

Note. n = 12. Holm corrections used to adjust p-values.

4.2 ONE SAMPLE T-TEST

A. ACMV ASSUMPTIONS

The result of the two-tailed one sample t-test was significant based on an alpha value of 0.05, t (11) = 15.92, p < .001, indicating the null hypothesis can be rejected. This finding suggests acmv was produced by a distribution with a mean not equal to 0. The results are presented in Table 3.

Table 3 Two-Tailed One Sample t-Test for the Difference between acmv and 0

Variable	M	SD	μ	t	p	d
acmv	4446.83	967.73	0	15.92	< .001	4.60

Note. Degrees of Freedom for the t-statistic = 11. d represents Cohen's d.

B. LIGHTING ASSUMPTIONS

The results of the Shapiro-Wilk test were significant based on an alpha value of 0.05, W = 0.86, p = .050. This result suggests lighting is unlikely to have been produced by a normal distribution, indicating the normality assumption is violated. The result of the two-tailed one sample t-test was significant based on an alpha value of 0.05, t (11) = 9.38, p < .001, indicating the null hypothesis can be rejected. This finding suggests lighting was produced by a distribution with a mean not equal to 0. The results are presented in Table 4.

Table 4 Two-Tailed One Sample t-Test for the Difference between lighting and 0

Variable	M	SD	μ	t	p	d
lighting	3257.92	1202.61	0	9.38	< .001	2.71

Note. Degrees of Freedom for the t-statistic = 11. d represents Cohen's d.

C. PLUG LOAD ASSUMPTIONS

The results of the Shapiro-Wilk test were not significant based on an alpha value of 0.05, W = 0.94, p = .551. This result suggests the possibility that plug load was produced by a normal distribution cannot be ruled out, indicating the normality assumption is met. The result of the two-tailed one sample t-test was significant based on an alpha value of 0.05, t (11) = 16.48, p < .001, indicating the null hypothesis can be rejected. This finding suggests plug load was produced by a distribution with a mean not equal to 0. The results are presented in Table 5.

Table 5 Two-Tailed One Sample t-Test for the Difference between plug load and 0

Variable	M	SD	μ	t	p	d
Plug load	1334.00	280.47	0	16.48	< .001	4.76

Note. Degrees of Freedom for the t-statistic = 11. d represents Cohen's d.

4.3 DISCUSSION OF FINDINGS

The result of energy usage developed of this research is used to investigate energy consumption and sustainability performance in the As-Sobirin mosque based on the current state of energy consumption in an organisation. The current energy usage performance of an organisation can be tabulated using the monthly energy consumption in the mosque. With the data of electrical bills, zoning of the mosque in floor area, ACMV systems, lighting systems, power supply, etc., an energy balance of the essential energy uses of the mosque was established.

A Pearson correlation analysis was conducted in this research, including acmv, lighting, and plug load in the As-Sobirin mosque. Next, Cohen's standard was used to evaluate the strength of the relationships, where coefficients between .10 and .29 represent a small effect size, coefficients between .30 and .49 represent a moderate effect size, and coefficients above .50 indicate a large effect size (Cohen, 1988). This is also explained in Figure 2, which concluded that the most significant positive value be identified by a large effect of the size that can be found in Table 2. It indicated that the main items in mosque As-Sobirin could affect energy consumption and sustainability performance.

Another data analysis result can be found in this research which is one sample t-test. One sample t-Test is a statistical hypothesis test used to determine whether the main items (ACMV, Lighting and Plug Load) in the As-Sobirin mosque is different from a specific value. Corresponding to the results, energy consumption proves that the main items of energy usage in As-Sobirin mosque were tallies with the sustainability assessment tools created from the government sector, which is 'penarafan hijau Jabatan Kerja Raya (phJKR) document.

5.0 CONCLUSION

This research has been able to establish the significant intersection between energy consumption and sustainability assessment tools, review and discuss successful practices to establish a clear understanding of energy efficiency in religious building in Malaysia. As a result of accelerated urbanization and improvement of living standards, the building sector has become a significant contributor to global energy consumption and constitutes the largest CO2 emitter sector. Nevertheless, it presents sustainable development potential very promisingly, whether for new constructions or existing buildings. Countries should establish an efficient and adapted sustainable strategy for buildings at the state level by developing more concrete and specific codes and regulations for each building category. Taking advantage of being an iconic building, mosque can play a very influential role in promoting these solutions and encouraging Muslim communities to adapt.

6.0 ACKNOWLEDGEMENT

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Decarbonising The Future: **The Roles of Malaysia's Quantity Surveyors In Carbon Efficiency**

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Keywords

Carbon efficiency, carbon emissions, decarbonisation, Malaysia, quantity surveyors (QS).

ABSTRACT

The construction industry plays an imperative role in the social development and economic growth of a country. However, it also contributes to the carbon emissions that lead to critical climate change issues for the environment. Climate change brings a huge negative impact as it leads to instability of agricultural production, disruptive weather disasters, and public health challenges. Thus, all parties in the construction industry must take initiative toward reducing the carbon footprint to limit the rise of global temperature. Having a clear mind on the role and responsibility of all parties in the construction industry to minimise the carbon emissions is the keynote to decarbonise the construction industry. However, there is no research conducted on the expanded role of quantity surveyors in the carbon efficiency in Malaysia. This research aims to investigate the roles of Malaysia's quantity surveyors in carbon efficiency. The research methodology used is quantitative method by incorporating the findings from the literature and the questionnaire survey that was distributed to the targeted respondents, which are the quantity surveyors in Malaysia. 357 (S=357) samples are required to suit a total population of 5,496 (N=5,496) according to Krejcie & Morgan (1970), and 21.19% of responses were received. The collected data was analysed by using Statistical Package for Social Sciences (SPSS). According to the outcome of this research, Malaysia's quantity surveyors have a better understanding of decarbonisation concept and aware about the carbon emissions issue in Malaysian construction industry. The findings of this research firms the needs of quantity surveyors to involve in decarbonisation as it provides the construction players an overview of the roles of quantity surveyors in decarbonised construction as well as the suitable adaptation strategies to be implemented by quantity surveyors towards the decarbonise practices.

1.0 INTRODUCTION

The construction industry plays an imperative role in social development and economic growth of a country. However, it is also the main sector that contributes the carbon emissions to our environment, which cause the critical climate change issue to occur (Zhang and Wang, 2015). About 19% of the global greenhouse gases (GHG) emissions come from the construction industry, thus carbon reduction and energy conservation have become the serious matter (Mathur et al, 2021).

Global warming is one of the most relevant global sustainability issues nowadays, which caused by the carbon emissions. Global warming has negatively impact and leads to agricultural production instability, disruptive weather disasters, and the public health challenges (Mathur et al, 2021). Therefore, the joint efforts of all individuals, organisations and governments are required to overcome and mitigate the imminent climate change issue. It is crucial for all parties in construction industry to take positive initiative towards reducing their carbon footprint to limit the rise in global temperature to 1.5 degrees Celsius by year 2050 ("Chapter 4 - Our decarbonisation pathway," 2022).

Based on the Malaysia's Third Biennial Update Report submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2020, the construction and manufacturing sector in Malaysia was the third largest contributor of carbon emissions at 9% in year 2016. Thus, it is urged that the reconsideration of the overall value chain together with the construction sector as we can find the existence of carbon footprint along the construction all the way via the operation of completed buildings and infrastructure. As example, the consumption of cement with high carbon emissions has contributed to 8% of global carbon emissions (Rodgers, 2018). There are various methods that Malaysia has adopted in minimizing carbon footprint. In 2016, the Public Works Department has adopted the Malaysian Carbon Reduction and Environmental Sustainability Tool (My Crest) and has mandated for all government building projects that worth RM50mil and above with the purpose of minimizing the carbon emissions in Malaysian construction industry (Ahmad Naqib Idris, 2016). Moreover, a 5-year plan of promoting low carbon cities was launched in Malaysia, namely the National Low Carbon Cities Masterplan (NLCCM), which involved 33 cities to achieve carbon neutrality. It is expected that 50% of energy to be saved for all 33 cities in NLCCM plan ("Third Biennial Update Report to the UNFCCC," 2020).

From the literature, there are limited studies on how the construction industry can meet their decarbonization target in year 2050. As one of the key players in the construction industry, the QS have a very important roles in quantifying the embodied carbon emission throughout the construction lifecycle (Grant Warner, 2022). Several research highlighted the roles of architect, engineer, and project manager in decarbonising (Ong et al,2020; Reza,2017). However, there is no detailed study of how Malaysia's QS can contribute themselves in decarbonising to achieve net carbon neutral target by year 2050. Thus, this led to uncertainties about how the Malaysia's QS should play their roles in reducing carbon footprint. In addition, most of the publications focus on the methods used to achieve carbon efficiency in foreign countries such as China and Korea. The current decarbonisation pathways used in Malaysian construction industry is yet to be studied. Thus, there is a need to investigate the roles of Malaysia's QS in carbon efficiency and decarbonising Malaysian construction industry.

1.1 RESEARCH BACKGROUND

With the increasing accumulation of GHG, the impact of global warming has become more serious and the average temperature levels are surpassing annually. Melting ice at unprecedented levels and the frequent of extreme natural disasters to occur has increase. Various researchers proven that the massive quantities of greenhouse gases are the main cause of climate change and it has been defined as the man-made phenomenon (Jackson, 2020; Monahan, 2013). Thus, it is utterly important to reduce the greenhouse gases especially from the construction industry (Mathur et al, 2021).

Various research on carbon footprint management can be found in the developed countries, such as China, Korea, United Kingdom, and United States (Du et al.,2019; Emma et al.,2015; Kang et al.,2015; Christopher et al.,2015). However, according to Mathur et al (2021), there is insufficiency of research on the carbon footprint management in Malaysian construction industry which lead to the low awareness level of QS towards the decarbonisation. Carbon footprint management can mitigate carbon emissions from the construction activity to minimize their impact on the climate changes. The measurement of the carbon footprint for buildings can be carried out based on five elements, which are the construction materials production and transportation, construction process, demolition, direct energy usage, and the waste disposal. However, not much effort taken by construction industry in capturing the overall possible carbon emissions and exploring the carbon reduction methods ((Mathur et al, 2021). Hence, it is imperative to determine the current carbon footprint management in Malaysian construction industry for achieving carbon efficiency.

Meanwhile, Omotayo et al (2022)recommended to carry out the study on the changing roles of QS in the context of the sustainable construction with the purpose of enhancing the current review on the roles of QS. It is because QS plays crucial role in the construction industry, starting from the pre-construction stage until the post construction stage (Omotayo et al., 2022). According to Omotayo et al (2022), there is lack of identification of the roles of QS in the emerging sustainable construction. Furthermore, Seidu et al (2019) pointed out that the absence of methods adopted by QS to change their roles to cope with the new decarbonised construction and achieve the carbon efficiency of buildings. This statement is supported by a previous study conducted by Wong (2021) that there is lack of awareness of QS in social responsibility and sustainable construction. Referring to the aforementioned research, QS plays a vital role in achieving carbon efficiency and decarbonising the Malaysian construction industry. Thus, there is an urgent need to explore the adaptation way for Malaysia's QS to the new decarbonised construction and the expanded roles of Malaysia's QS under the sustainable construction scope.

Thus, there is a lack of research on the expanded role of QS in carbon efficiency of buildings that enables the Malaysian construction industry to achieve the target of net zero carbon in year 2050. Therefore, this research is crucial to address these problems and help to identify the full potential of QS to perform their roles in carbon efficiency of buildings in Malaysia. Additionally, this research will increase the awareness of QS in the effect of carbon on the wide range of quantity surveying practices in Malaysian construction industry.

1.2 RESEARCH AIM AND OBJECTIVES

The aim of the research is to investigate the roles of Malaysia's quantity surveyors in carbon efficiency. Four research objectives are identified as follows,

i. To identify the awareness of quantity surveyors towards the decarbonisation in Malaysian construction industry.
ii. To determine the roles of Malaysia's quantity surveyors in decarbonisation.
iii. To evaluate the technique of adaptation to the decarbonised construction by quantity surveyors in Malaysia.
iv. To suggest the adaptation strategy of Malaysia's quantity surveyors towards the decarbonisation practice.

2.0 LITERATURE REVIEW – OVERVIEW OF QS

QS is a construction industry professional that provides services across many industries globally. In the construction industry, QS are involved in all stages of project throughout the whole lifecycle, starting from feasibility stage, design stage, construction stage, refurbishment stage, maintenance stage, and demolition stage. Construction products that can achieve clients' requirements and value system is the main target set by the QS. QS involves in different areas of construction industry, such as procurement and contractual area, cost management area, and strategic planning area. In other words, QS plays different roles in different work aspects of construction industry (Abdul & Paul, 2015).

2.1 BASIC ROLES OF QS

The roles of QS start from the preliminary stage until the post-construction stage of a construction project, Table 1 shows the basic roles of QS.

Table 1. Basic roles of QS

Basic roles of QS	Authors
Prepare preliminary cost estimation and cost planning	RISM (2022); Sheikh et al. (2021); Salleh et al. (2020); Mohd Noor et al. (2020); PAQS (2019); Wong (2017); Babu (2015)
Prepare cost schedules	Sheikh et al. (2021); Salleh et al. (2020); Mohd Noor et al. (2020); PAQS (2019); Babu (2015)
Advice on procurement, tendering and contractual procedures	RISM (2022); Sheikh et al. (2021); Salleh et al. (2020); Mohd Noor et al. (2020); Wong (2017); Jalil et al. (2017); AbdulLateef et al. (2015)
Prepare bill of quantities and specifications	RISM (2022); Sheikh et al. (2021); Salleh et al. (2020); PAQS (2019); Wong (2017); Babu (2015); AbdulLateef et al. (2015); Chong (2014)
Prepare tender documents and organize the tendering process	RISM (2022); Sheikh et al. (2021); Salleh et al. (2020); AbdulLateef et al. (2015)
Evaluate tender reports and tender negotiation	RISM (2022); Salleh et al. (2020); Babu (2015); AbdulLateef et al. (2015)

2.2 ADDITIONAL ROLES OF QS

Besides the basic roles of QS as explained above, QS also provides additional roles as listed in Table 2 below.

Table 2: Additional roles of QS

Additional role of QS	Authors
Prepare feasibility studies	RISM (2022); Salleh et al. (2020); Mohd Noor et al. (2020); PAQS (2019); Wee (2017); Wong (2017)
Estimate the expenditure of project and development	RISM (2022); Salleh et al. (2020); AbdulLateef et al. (2015)
Evaluate registered contractors for prequalification	RISM (2022); Salleh et al. (2020)
Life cycle costing	RISM (2022); Sheikh et al. (2021); Salleh et al. (2020); Mohd Noor et al. (2020); PAQS (2019); Wong (2017); Babu (2015); AbdulLateef et al. (2015)
Cost benefit analysis	Sheikh et al. (2021); Salleh et al. (2020); Wee (2017)
Price bills of quantities (BQ) and negotiate on the contract rate	RISM (2022); Salleh et al. (2020); Wee (2017)
Project management	Sheikh et al. (2021); Mohd Noor et al. (2020); PAQS (2019); Wee (2017)
Risk management	Salleh et al. (2020); PAQS (2019); Wee (2017)
Value management / Value Engineering	Salleh et al. (2020); Mohd Noor et al. (2020); PAQS (2019); Wee (2017); Wong (2017)
Facilities management	Salleh et al. (2020); Mohd Noor et al. (2020); Wee (2017)
Quality management	Sheikh et al. (2021); Salleh et al. (2020); PAQS (2019)
Insurance valuation	RISM (2022); Sheikh et al. (2021); Salleh et al. (2020); Wee (2017)
Tax adviser	Sheikh et al. (2021); Salleh et al. (2020); Wee (2017)

Additional role of QS	Authors
Arbitrator or mediator for dispute resolution.	Sheikh et al. (2021); Wee (2017); Babu Reddy (2015)
Premises and technical audits	Wee (2017); Babu Reddy (2015)
Valuation of contractual claim for litigation	RISM (2022); Salleh et al. (2020)

2.3 EXPANDED ROLES OF QS IN GREEN CONSTRUCTION

Furthermore, QS also involved in green construction. Table 3 summarises the expanded role of QS in green construction.

Table 3: Expanded roles of QS in green construction.

Expanded role of QS in green construction	Description
Green costing	The technologies that emerged are being adopted in green buildings and the related costs.
Carbon footprint	The current level of carbon emissions is being measured by adopting the carbon management strategy.
Life cycle costing	Cost management of building throughout the life cycle.
Property performance reporting	Report submitted by the building owners to know the existing performance measurement tools and understand how to meet new standards.
Green building rating assessment	Advice clients on sustainable designs and costing.
Building Information Modelling (BIM)	The integral management platform for the information throughout the lifecycle of project.

Source: Salleh et al (2020); Wong (2017)

2.4 CARBON EMISSIONS

The main greenhouse gas emitted to the environment is carbon dioxide (CO2), which also known as carbon emissions. CO2 is naturally occurred in the atmosphere, such as the natural circulation of carbon among the atmosphere, soil, plants, oceans, and animals (Overview of Greenhouse Gases, 2022). Carbon emissions are determined and recorded as elemental carbon with KT (kiloton) as the unit of measurement. The carbon emissions in Malaysia escalated from 244,410 KT in 2018 to 253,270 KT in 2019, consisting of gases from the cement manufacture and the burning of fossil fuels (Malaysia CO2 Emissions, 2022).

2.4.1 CARBON EMISSIONS ISSUE IN MALAYSIA

Carbon emissions has turned out to be a serious problem in Asian countries that are experiencing rapid urbanisation, such as China, Malaysia, and Singapore. In Malaysia, the construction industry is the main contributor of carbon emissions as it brings huge amounts of carbon emissions to the country (Fujita et al.,2009).

Based on the research by Safaai et al. (2011), the population in Malaysia contribute to the carbon emissions, where there was 68.86% increase in the level of carbon releases as compared to the level of carbon emissions in earlier years. Furthermore, the gross domestic product (GDP) in Malaysia also contributed to the carbon emissions level. (Safaai et al.,2011).

According to Zolfagharian et al. (2012), Malaysian construction industry has negatively impacted the ecosystem by 67.5% due to the construction activities. Not only that, it also affects the public by 11.5% and the natural resources by 21% respectively. The quality of human life and the natural environment are highly affected by the construction in Malaysia as the impacts brought by the Malaysian construction industry

are irreversible and directly affect the different areas (Zhang et al., 2020). Figure 1 illustrates the relationship between construction output and CO2 emissions in Malaysia. It shows that the carbon emission in Malaysia have been steadily increasing from 2000 to the first quarter of 2023 without any significant declines, despite a decrease in construction output, especially during 2019 till 2021 due to COVID-19 pandemic. Therefore, there is a need in Malaysia to control and manage the carbon emissions from the construction activities. However, there is lack of initiatives by Malaysia to reduce the carbon footprints from the construction industry (Esmaeilifar, 2017).

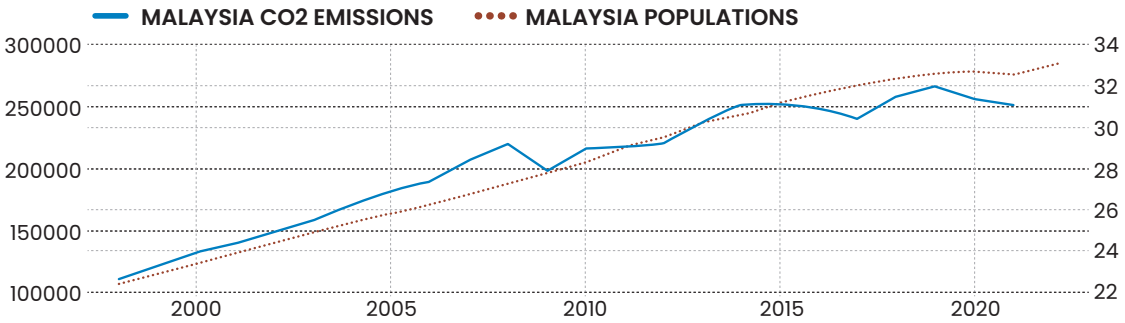

Figure 1. Relationship between construction output and CO2 emissions in Malaysia (Malaysia CO2 Emissions, 2023)

2.5 DECARBONISATION PATHWAYS

The reduction of GHG emissions into the environment is known as decarbonisation. The term decarbonisation consists of the word carbon because the carbon dioxide (CO2) is the largest contributor to this issue, but it also refers to the reduction of other gases such as nitrous oxide (N2O), ozone (O3), and methane (CH4) (Why Is Decarbonisation Important?, 2022). Decarbonisation is crucial in decelerating the climate change issue by eliminating the greenhouse gas emissions into the atmosphere. 39% of global greenhouse gas emissions come from the building construction sector, consisting of 28% of operational emissions and 11% of construction and building materials (Decarbonizing Construction: The What, Why, and How, 2022). Therefore, it is imperative for the acceleration of decarbonisation in the construction industry, especially for the building construction sector.

2.5.1 DECARBONISATION PATHWAYS ADOPTED BY MALAYSIA

The implementation of decarbonisation has been carried out by Malaysia in several sectors, such as the energy, transportation, waste, and forestry. Based on the Malaysia's latest biennial update report to the UNFCCC in 2020, Malaysia has implemented the Feed-in-Tariff programme, hydropower projects and other renewable energy generation projects, in which the GHG emissions avoidance of 7,262,59 Gg CO2-eq in energy sector. Not only that, the implementation of palm-based biodiesel in Malaysia also eliminated 1,127.34 Gg CO2-eq in energy sector while the National Energy Efficiency Action Plan brought a positive impact in decarbonisation by mitigating 458.02 Gg CO2-eq ("Third Biennial Update Report to the UNFCCC," 2020).

In the transportation sector, the rail-public transport had avoided 212.93 Gg CO2-eq and the natural gas vehicles had reduced 114.77 Gg CO2-eq. Furthermore, the usage of hybrid and electric vehicles in Malaysia also eradicate 90.65 Gg CO2-eq. The decarbonisation pathway of Malaysia also involved in the waste sector, where the recycling of wastepaper brought significant reduction of greenhouse gas emissions at 3,937.76 Gg CO2-eq and the recovery of biogas from palm oil mill effluent avoided 2,377.84 Gg CO2-eq. In addition, Malaysia also contributed the decarbonisation in forestry sector by implementing sustainable management of permanent reserved forest and sustainable harvesting of timber. The enrichment programme and protected areas for forest also increased which helped in the reduction of greenhouse gas emissions at 20,307.50 Gg CO2-eq ("Third Biennial Update Report to the UNFCCC," 2020).

Several research highlighted the decarbonisation pathways adopted by other countries, such as China, United Kingdom, Europe, and United States (Kevin et al.,2008; Wu et al.,2016; Du et al.,2019; Favier,2018). However, there is lack of decarbonisation pathways in Malaysian construction industry.

3.0 METHODOLOGY

To achieve the aim and objectives of this research, the adopted method to collect primary data is entirely quantitative which incorporates the use of questionnaire survey that will be distributed to the targeted respondents. The questionnaire survey has been chosen as the strategy of data collection due to the limitation of time given for conducting this research. The secondary data will be gathered by reviewing the existing literature and data available on numerous secondary sources.

3.1 PRIMARY DATA COLLECTION: LITERATURE REVIEW

Literature review is conducted to gather secondary data and at the same time it helps the researcher to identify and have a better understanding to the relevant knowledge of the research area. The way of conducting literature review is mainly through searching of scientific references available via university subscribed databases such as ScienceDirect, Emerald, JSTOR, ResearchGate and EBSCO. Moreover, sources such as Google Scholar is utilised to gain more key points, relevant information, concepts, and terminologies. Literature review is crucial as it helps the researcher to acquire adequate knowledge of the research area in order to ease the process of collecting primary data. In short, a sufficient literature review can spot the issue under consideration, disclose the essential purpose of the research, and deliver the relevant information of the research while conclude the research by conveying the significant results that related to the research.

3.2 SECONDARY DATA COLLECTION: QUESTIONNAIRE SURVEY

The online questionnaire method is adopted as the quantitative approach for collecting the primary data as a huge number of participants are involved in this research. The research surveys are highly used as the information and data can be collected directly in the shortest time and a large sample can be utilised (Chiang, 2015). Not only that, the research surveys are practical and suitable for this research due to the time constraints of this research. The questionnaire is distributed to the targeted respondents via online platforms, such as email and phone message.

This research focuses on the roles of Malaysia's QS in carbon efficiency. Thus, the research determines the scope and chooses the suitable respondents. The respondents that will be approached are the registered QS with the Board of Quantity Surveyors Malaysia (BQSM) and the overall population size is based on the official website, shown in Table 3 below.

Table 4: Population size of targeted respondents

Expanded role of QS in green construction	Population Size (N)
Quantity Surveying Technologist	101
Provisional Quantity Surveyor	3,656
Professional Quantity Surveyor	591
Consultant Quantity Surveyor	1,148
Total	**5,496**

Source: BQSM (Jan, 2023)

The sampling size determination table by Krejcie and Morgan (1970) was adopted to overcome the problem of large number respondents in this research. Thus, the required sample size is 357 (S=357), according to the total population size of 5,496 (N=5,496).

3.3 DATA ANALYSIS

The response rate was 21.19% where 420 sets of questionnaires were sent out and 89 sets were completed and returned. According to Dulami et al (2003), the response rate from the construction industry is around 20% to 30% while Idrus et al. (2008) opine that the norm response rate for the questionnaire survey from the construction industry is 5% to 15%. Therefore, the response rate of 21.19% from the construction industry is common and acceptable.

Cleaning of raw data was conducted to reduce inconsistencies. The outliers of data were detected by using boxplots, followed by assessing the internal consistency of the scale using Cronbach's Alpha. The roles of QS in carbon efficiency displayed excellent internal consistency, with Cronbach's Alpha of 0.932. Next, the mean and standard deviation for each item were calculated to determine the significance of the QS's roles in carbon efficiency. The items were then ranked from the highest mean to the lowest mean, using relative importance index (RII).

The normality of data collected was then tested by using Kolmogorov-Smirmov test. Visual inspection has also been adopted in testing the normality of data. The Kruskal-Wallis test was conducted at a confidence interval of 95% to test the hypotheses. It is the extension to the Mann-Whitney test as it can test more than two independent variables, and also it is a non-parametric alternative to the one-way ANOVA. The hypotheses created were as follows:

H0. There is no significant difference between the roles of quantity surveyors in decarbonisation based on respondents' experience in decarbonisation.

H1. There is a significant difference between the roles of quantity surveyors in decarbonisation based on respondents' experience in decarbonisation.

4.0 FINDINGS AND DISCUSSION

Table 5 shows that most of the respondents had 1 to 5 years' experience (39.33%) and more than 20 years' experience (20.22%) in construction industry, indicating that more knowledge were shared by them in various point of view. Table 5 further reveals that the majority of the respondents (59.55%) had no experience in decarbonisation even though 42.70% of respondents have high level of understanding in decarbonisation. Also, none of the respondents has involved in decarbonised construction projects more than 10 years, indicating that decarbonisation is a new concept to Malaysia construction industry.

Table 5: Background information of respondents

Variables	Level	Percent
Years of experience in construction industry	Less than 1 year	14.61
	1 – 5 years	39.33
	6 – 10 years	6.74
	11 – 15 years	14.61
	16 – 20 years	4.49
	More than 20 years	20.22
Current knowledge and understanding in decarbonisation	Low	38.20
	`Medium	4.49
	High	42.70
	Very high	0.00
Years of experience in decarbonisation	No experience	59.55
	Less than 1 year	23.60
	1 – 5 years	13.48
	6 – 10 years	3.37
	More than 10 years	0.00

4.1 THE ROLES OF QS IN DECARBONISATION

Table 6 shows the results of Kruskal-Wallis test and RII ranking for the roles of QS in decarbonisation. There is significant difference for the quantity surveyors' roles in decarbonisation among different categories of respondents' experience in decarbonisation based on the Kruskal-Wallis test. The "life cycle costing analysis (LCC)" and "building performance reporting" have different distribution across the categories of respondents' experience in decarbonisation as its significant value is lesser than 0.05, which are 0.042 (p=0.042) and 0.012 (p=0.012) respectively.

The null hypotheses of both statements mentioned have been rejected as their significant values are less than 0.05. It is because the life cycle costing analysis (LCC) is not only had to be performed by QS in decarbonisation but in any construction projects as it is the additional role of QS (RISM,2022; Sheikh et al,2021; Salleh et al,2020; Mohd Noor et al,2020; PAQS,2019; Wong,2017; Babu,2015; AbdulLateef et al,2015). On the other hand, preparing building performance report is not the roles of QS in decarbonisation as it ranked last in RII ranking. This statement is aligned with the findings of Salleh et al (2020) and Wong (2017) that the building performance reporting shall be done and submitted by the building owners instead of QS. Based on the submitted reports, QS then only can understand the existing performance measurement tools and know how to meet new standards (Salleh et al,2020; Wong, 2017).

Besides the above-mentioned statements, the other 14 roles of quantity surveyors in decarbonisation have no significant differences based on the respondents' experience in decarbonisation. Their significant values are greater than 0.05, and thus the null hypothesis can be retained. The roles of QS in assisting team to updated cost estimation has the highest significant value of 0.996 (p = 0.996) and ranked first in RII ranking with the highest mean value of 4.157 among all the roles as it is the vital role of QS in decarbonisation. Without updated estimation of cost, the chance for construction projects to fail is very high, especially for new decarbonised projects (Wong,2017; Salleh et al,2020). Thus, majority of the respondents agree that assisting team in updated cost estimation is the roles of QS in the field of decarbonisation.

In short, the Kruskal-Wallis test indicates that majority of the QS's roles in decarbonisation do not have significant differences based on the experience of respondents in decarbonisation. Only the life cycle costing analysis (LCC) and building performance reporting have significant differences and thus the null hypothesis for both statements have been rejected.

Table 6: Kruskal-Wallis test and RII ranking for the roles of QS in decarbonisation

The Roles Of QS In Decarbonisation	Kruskal-Wallis Test		Relative Importance Index		
	Significance value	Decision	Mean	RII	Rank
Assist team in updated cost estimation	0.996	Retain H0	4.157	0.8315	1
Assist team to set realistic budget	0.912	Retain H0	4.101	0.8202	2
Life cycle costing analysis (LCC)	0.042	Reject H0	4.022	0.8045	3
Cost benefit analysis (CBA)	0.157	Retain H0	4.011	0.8022	4
Cost estimation for each building design iteration	0.926	Retain H0	4.011	0.8022	4
Review final bid documents with the design team	0.719	Retain H0	3.978	0.7955	6
Green costing	0.626	Retain H0	3.921	0.7843	7
Building information modelling (BIM)	0.833	Retain H0	3.921	0.7846	7
Ensure both costs and credits for low carbon features are accounted for	0.259	Retain H0	3.843	0.7685	9
Low carbon materials pricing and cost estimation	0.709	Retain H0	3.831	0.7663	10
Value engineering on low carbon materials to be used for the project	0.662	Retain H0	3.798	0.7596	11

The Roles Of QS In Decarbonisation	Kruskal-Wallis Test		Relative Importance Index		
	Significance value	Decision	Mean	RII	Rank
Maintain database for low carbon building products from various specialists and suppliers	0.407	Retain H0	3.685	0.7371	12
Carbon footprint management	0.596	Retain H0	3.427	0.6854	13
Low carbon footprint strategy development	0.982	Retain H0	3.371	0.6742	14
Low carbon building rating assessment	0.632	Retain H0	3.303	0.6607	15
Building performance reporting	0.012	Reject H0	3.191	0.6382	16

Null hypothesis (H0): The distribution of variable is same across the categories of respondents' experience in decarbonisation.

4.2 THE AWARENESS LEVEL OF QS TOWARDS DECARBONISATION IN MALAYSIA

Table 7 displays the RII ranking for the awareness level of QS towards decarbonisation in Malaysia. "QS is aware about the sustainable construction", "QS is aware that the carbon emission issue brings huge negative impact", and "QS is aware about the serious global warming issues caused by carbon emissions" are listed as the top three statements, indicating most of the respondents showed their agreement to these three statements. These findings are supported by the research conducted by Crippa et al (2020), which mentions that the developed countries such as Japan, China, India, United States and etc have higher carbon emissions issues due to their advance industrial activities.

Furthermore, most of the respondents have similar opinion towards "QS is aware about the carbon emission issue from Malaysian construction industry" and "QS is aware about the social responsibility in the decarbonised construction industry" since they are ranking fourth and fifth respectively. The statement of "QS is aware about the decarbonisation pathways in Malaysian construction industry" ranked last in the RII ranking as it has the least value of RII. This finding is consistent with the research conducted by Esmaeilifar (2017), which highlights the lack of initiatives taken by Malaysian construction industry to minimise carbon footprints.

From the tabulated result, we can summarise that Malaysia's QS are aware of the carbon emissions issue in construction industry which brings huge negative impacts such as global warming and at the same time, they are aware of sustainable construction in Malaysia. However, Malaysia's QS still have low awareness level towards the decarbonisation pathways and their social responsibility in decarbonised construction industry.

Table 7: RII ranking for the awareness level of QS towards decarbonisation in Malaysia

The awareness level of QS towards decarbonisation in Malaysia	Relative Importance Index		
	Mean	RII	Rank
QS is aware about the sustainable construction	3.809	0.7618	1
QS is aware that the carbon emission issue brings huge negative impact	3.708	0.7416	2
QS is aware about the serious global warming issues caused by carbon emissions	3.640	0.7281	3
QS is aware about the carbon emission issue from Malaysian construction industry	3.551	0.7101	4
QS is aware about the social responsibility in the decarbonised construction industry	3.169	0.6337	5
QS is aware about the decarbonisation pathways in Malaysian construction industry	2.989	0.5978	6

4.3 THE TECHNIQUE OF ADAPTATION TO THE DECARBONISED CONSTRUCTION BY MALAYSIA'S QS

Table 8 presents the RII ranking for each statement related to the techniques of adaptation by Malaysia's QS to the decarbonised construction, indicating the level of agreement expressed by the respondents. Based on observation, the statement ranked first with the highest RII is "build up cost database by collecting costs from suppliers on decarbonisation services and products". This highlights the importance of cost management for QS in decarbonised construction. It is their fundamental role and utterly crucial in achieving a sustainable built environment (Sheikh et al.,2021; Salleh et al.,2020; PAQS,2019; Babu Reddy,2015). The second-ranked statement in RII is "sustainability education and knowledge (focusing on the reduction of carbon emissions)", which emphasises on the importance of knowledge and education in sustainability and decarbonisation pathways that are essential for quantity surveyors to adapt to the changing needs of the industry.

The third-ranked statement is "attend seminars on decarbonisation pathways", which further underscores the importance of continuing education in the field as knowledge is the springboard for quantity surveyors to adapt well to the decarbonised construction. Furthermore, the fourth and fifth-ranked statements in the RII are "lack of adaptation technique by QS to the decarbonised construction" and "enhancement of QS with related skills and knowledge in decarbonisation via research" respectively. These statements indicate that research may not be the most effective adaptation technique for quantity surveyors in enhancing their skills and knowledge in decarbonisation. However, the adaptation techniques currently adopted by QS to decarbonised construction are sufficient at present (Waniko, D., 2022).

Table 8: RII ranking for the technique of adaptation to the decarbonised construction by QS

The technique of adaptation to the decarbonised construction by Malaysia's QS	Relative Importance Index		
	Mean	RII	Rank
Build up cost database by collecting costs form suppliers on decarbonisation services and products	4.202	0.8404	1
Sustainability education and knowledge (focusing on the reduction of carbon emissions)	4.079	0.8157	2
Attend seminars on decarbonisation pathways	3.989	0.7978	3
Lack of adaptation technique by QS to the decarbonised construction	3.966	0.7933	4
Enhancement of QS with related skills and knowledge in decarbonisation via research	3.944	0.7888	5

4.4 THE SUGGESTED ADAPTATION STRATEGIES TOWARDS THE DECARBONISED CONSTRUCTION

Table 9 presents the percentage ranking for the suggested adaptation strategies towards the decarbonised construction. The "involvement in decarbonisation related projects" is suggested by most of the respondents as the most suitable strategy for the adaptation towards the decarbonised construction as it has the highest percentage of 32.63% (N = 77). This preference stems from the understanding that QS gain direct experience and knowledge related to decarbonisation by actively participating in such projects as the decarbonisation trend provides both risk and opportunity to QS (Glodon,2022). Furthermore, "decarbonisation related activities by QS professional bodies" is considered as the second most suitable adaptation strategy, with a percentage of 24.15% (N = 57). Professional bodies play a crucial role in guiding the quantity surveyors towards the correct ways of adapting to the decarbonisation trend through their dedicated activities in this area.

Next, "courses" and "seminars" have also been suggested by the respondents as the viable strategies for adapting to the decarbonised construction, with a percentage of 21.19% (N = 50) and 20.76% (N =49) respectively. These educational avenues that serve as the imperative platforms for QS to acquire new knowledge and gain a deeper understanding of decarbonisation concepts. This is because the requirement of carbon assessment such as cost reporting and controlling has aligned to the skills of QS (Glodon,2022). Lastly, "government to mandate rules and regulations towards the decarbonised construction industry" receives the least respond as the adaptation method to the decarbonised construction industry as it only has a percentage of 1.27% (N = 3). This is because the respondents perceive that it is challenging for the government to create and enforce the new rules and regulations specifically towards the decarbonised construction industry.

Table 9: Percentage ranking for the suggested adaptation strategies towards the decarbonised construction

The suggested adaptation strategies towards the decarbonised construction	Respondent		Rank
	N	Percent	
Involvement in decarbonisation related projects	77	32.63	1
Decarbonisation related activities by QS professional bodies	57	24.15	2
Courses	50	21.19	3
Seminars	49	20.76	4
Government to mandate rules and regulations towards the decarbonised construction industry	3	1.27	5

5.0 CONCLUSIONS

This research studied the roles of Malaysia's QS in decarbonisation and identified the current awareness level of QS towards decarbonisation. The technique of adaptation by QS towards the decarbonised construction has been evaluated and suggested too. The main finding of this research shows that Malaysia's QS have certain level of understanding on their roles in decarbonisation. The top five QS's roles in decarbonisation are assisting team in updated cost estimation, assisting team to set realistic budget, life cycle costing analysis (LCC), cost benefit analysis (CBA), and cost estimation for each building design iteration. On the other hand, the roles of QS least related to decarbonisation are building performance reporting, low carbon building rating assessment, and low carbon footprint strategy development.

Based on findings, QS in Malaysia have low awareness level towards decarbonisation pathways and their social responsibility. The most common adaptation strategy used by QS is build up cost database by collecting costs from suppliers on decarbonisation services and products while involving in decarbonisation related projects has been suggested by the respondents as the most suitable adaptation strategies towards decarbonised construction. Another important finding of this study is that QS tend to perceive the significance of QS's roles in decarbonisation differently based on their experience in decarbonisation.

These findings have contributed to the body of literature on the roles of QS in decarbonisation as it provides better understanding of the roles of QS in decarbonised construction. Subsequent research could employ this study as a foundation and devise adaptive strategies for QS in decarbonised construction. From practical viewpoint, it has highlighted the most related roles of QS and adaptation strategies. Thus, this research can be used as reference for Malaysia's QS to adapt themselves towards the decarbonised construction so that they are competent to carry out their duties more effectively and efficiently.

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The Kampung Boy

Memoirs of Sr Dr Khoo Boo Khean

Reviewed by:
Sr Kwan Hock Hai,
Past President, RISM

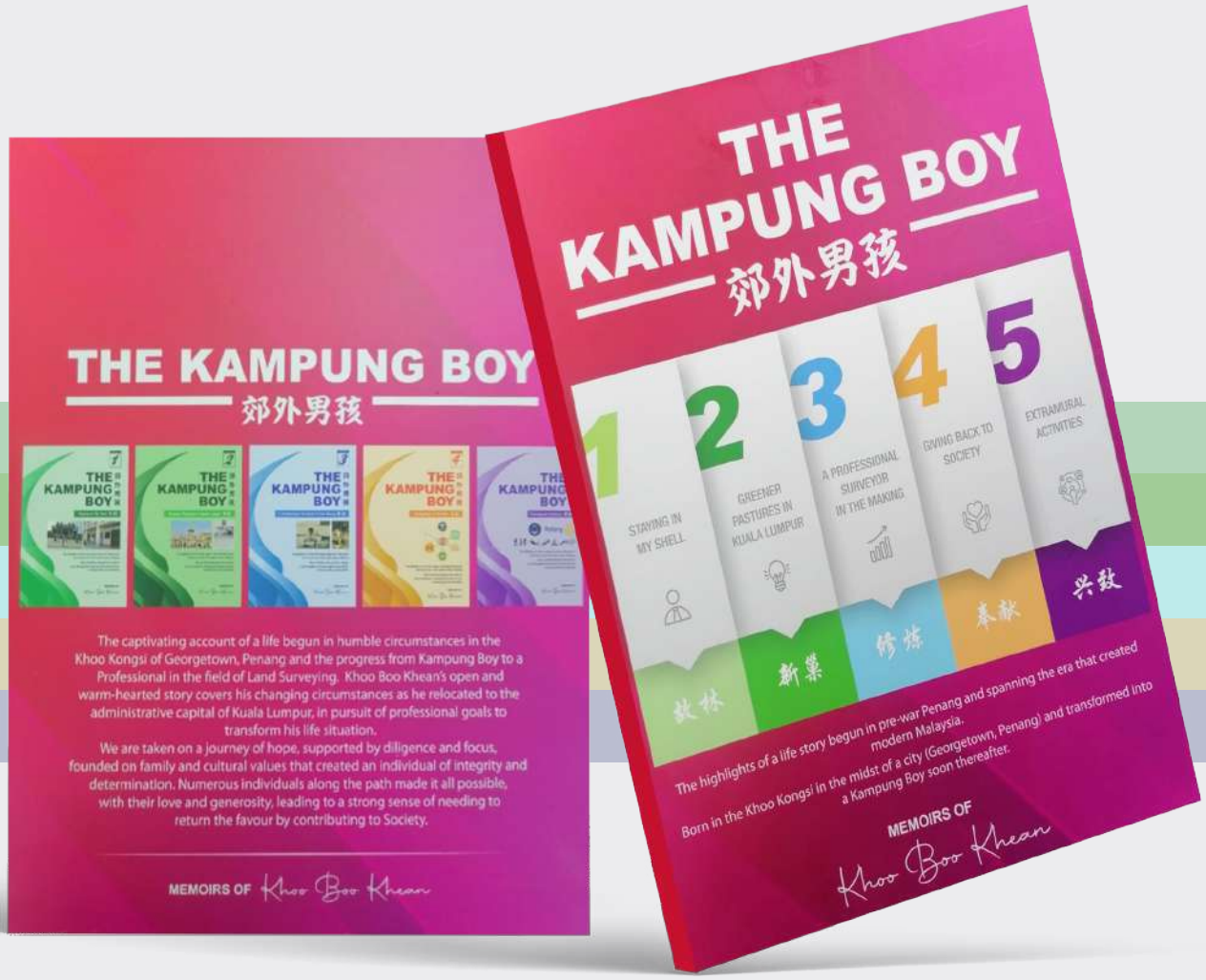
While some of us moped about being confined o to our homes during the recent MCO, Past President Sr Khoo Boo Khean sat and wrote his memoirs on his mobile phone. As an octogenarian, Sr Khoo thought a memoir is the best way to record for posterity the many interesting people he has met. It will also be an opportunity to pass on his cultural values of family history and roots to the younger generation. The "notes" on his mobile phone were eventually compiled in a five volumes collection (typical of a surveyor's systematic planning and management) entitled The Kampung Boy.

Basically, the contents of the volumes are:

Volume 1	"***Staying in my Shell***" regarding his humble beginnings in Penang
Volume 2	"***Greener Pastures in Kuala Lumpur***" regarding his progress academically and family life
Volume 3	"***A Professional Surveyor in the Making***" regarding his professional career
Volume 4	"***Giving Back to Society***" regarding his contributions to RISM and other associations
Volume 5	"***Extramural activities***" regarding his other love and passions

The memoirs are written in simple language and when reading, it is like Sr Khoo sitting beside you and narrating it himself. There are of episodes of history, jokes, romance, love, family life, working life and business advices. Sr Khoo's contributions to RISM since 1964 is narrated in Volume 4.

And there are sweet love notes to the Girl in His Heart, for a love that has blossomed since 1960 and they are blessed with 3 children. The memoirs are also dotted with Chinese poems, a new love of Sr Khoo. The many photos make the memoirs a delightful read.



25th INTERNATIONAL SURVEYORS' CONGRESS (ISC)

The 25th International Surveyors' Congress (ISC) drew strong participation of over 400 stakeholders in the built environment under one roof to discuss its issues and challenges under the theme Embrace: Adapt: Engage – Are Surveyors Future Ready?

The participants included land surveyors, building surveyors, quantity surveyors, property consultants, valuers, estate agents, property managers and developers, government officials, academicians and students.

ISC 2023 is an excellent platform for the sharing of knowledge and experience on the contemporary topic of sustainability, environmental, social and governance (ESG), climate change and net zero, as well as, smart city development and trends in digital technology advancement in the built environment and real estate.

The Plenary Session 1 covers a variety of future-forward topics affecting the professions were presented by notable speakers. The impact of technology in urban living were discussed in

The Smart Cities Challenge, Technologies and Trend from Perspective of Surveyor and Construction, presented by Selangor Research Institute director Dr Fahmi Ngah, while Turner International Malaysia country manager CJ Chen told the audience about cutting edge engineering and construction methods used in the construction of the Merdeka 118.

ESG incorporation into construction practices was presented by TRX City Sdn Bhd group chief executive officer Datuk Azmar Talib, offering the audience seminal knowledge of practical ESG at one of the country's upcoming key infrastructures.

The Plenary Session 2 was seeing the deliberations on Future Smart Solutions. This topic was presented by Sr Aina Edayu Ahmad, The Director of National Property Information Centre and TPr. Ts. Norliza Hashim, The Chief Executive, URBANICE Malaysia.

The Plenary Session 3 was discussing about the Future Economy and Sustainability. This topic presented by Mr. Che Rasid Che Seman, Director of Central Zone Project Office, PLAN Malaysia.

The Parallel Sessions addressing the current issues related to the Geomatics and Surveying, Quantity Surveying, Property Surveying and Building Surveying.

The congress has also facilitated knowledge-sharing by practitioners in other countries, such as by Meinhardt Singapore chief operating officer Eugene Seah, who discussed the use of the latest technology including ChatGPT in building surveying. A chartered building surveyor from Building Appraisal Pte Ltd, Singapore, shared the good practices and regulations concerning building defect inspection in the city-state.

Attendees also have the opportunity to get up close with the latest products and services relevant to their professions as the host has lined up about twenty exhibitors at the congress, ranging from valuers, drone and lidar vendors, total stations, building management systems and others.

62nd ANNIVERSARY DINNER

The 62nd Anniversary Dinner was held in the Manhattan Ballroom, Berjaya Times Square Hotel, Kuala Lumpur and was graced by Sr Dainna Baharuddin, President, Royal Institution of Surveyors Malaysia.

Altogether there were 70 tables. The 62nd President, Sr Adzman Shah bin Mohd Ariffin was duly installed by the immediate Past President Sr Dainna Baharuddin during this dinner.

The prestigious ceremony saw 9 trophies handed out for 6 categories under the Excellence Awards.

- RISM Exemplary Leadership Awards
- RISM Young Surveyor of the Year
- RISM Outstanding Contribution Towards Sustainability
- RISM Outstanding Writer on Property & Construction
- RISM Lifetime Achievement Award
- Tokoh Juruukur Malaysia Award

Besides the presentations of Excellence Awards to surveyors and related industry players, presentation of Mock Cheque to Special Olympic Malaysia to Yayasan Raja Muda Selangor were also presented.

RISM 62ND
ANNUAL GENERAL MEETING

The 62nd Annual General Meeting of RISM was held on 16 June 2023, Friday at Manhattan II, Berjaya Times Square Hotel, Kuala Lumpur.

The AGM was chaired by the RISM President, Sr Dainna Baharuddin. As part of the agenda during the AGM there was the appointment of internal auditors, announcing the members of General Council for session 2023/2024, the presentation of Certificates of Appreciation to previous Councillors for the session 2022/2023 and to present Diplomas to New Members and RISM Examination Certificates.

PAQS CONGRESS 2023 KUALA LUMPUR

Decarbonising the Future: Role of QS

The 1st PAQS Congress was held in Singapore in June 1997 and this included the PAQS Annual Board meeting and a technical and social program. The Congress was opened to delegates from all the PAQS member countries and approximately 160 attended the program. At this meeting, the Institution of Surveyors Malaysia attended officially for the first time as a full member.

Malaysia has hosted PAQS thrice in 1999, 2009 (in Kuala Lumpur) and 2019 (in Kuching). This time, the Royal Institution of Surveyors Malaysia (RISM) welcomes all the delegates to the metropolitan city of Kuala Lumpur for PAQS 2023.

The building sector is responsible for nearly half of annual global carbon dioxide emissions and therefore reducing carbon emissions has become the trend for future buildings. Carbon emissions from buildings and construction projects are sourced from both operational emissions; largely due to the energy used in operating the building throughout its life and; embodied emissions, by and large, attributable to the energy used for the extraction, processing, manufacturing, and delivery of building and construction materials to the project site.

Despite the fact that the transition to a low-carbon economy is gaining momentum, there is still a great deal of work to be achieved. Decarbonisation involves significant commitment from everyone. It requires a transformational shift in the way we operate; from sourcing, using, consuming, and thinking about energy. It also requires a substantial financial commitment from investors and governments.

PAQS 2023 brings you closer to synergising this effort of decarbonisation of our built environment. Quantity surveyors and cost engineers have roles to play in this mission. Papers and presentations of new and emerging ideas are welcome through the following sub-themes:

Quantity Surveyor's Roles, Practices, and Management in Carbon Efficiency

This theme invites industry practitioners and academia views and records of best practices on the effort exerted in reducing carbon footprint within a wide range of quantity surveying practices. It aims to gather insight into the changing roles, and the way practices ought to adapt to the change brought by resilient future practices in quantity surveying and beyond. This theme embraces the fundamental topic of management in quantity surveying practices, alignment of carbon awareness with quantification and finance, and the efficient use of resources. The growing interest in the effect of carbon on the wide range of quantity surveying practices and management would be addressed in meeting the need for sustainable quantity surveying practices.

Building Liveable and Resilient Cities

Green and sustainable solutions are called upon to make our built environment more liveable and resilient to deal with climate change implications. Green policies, such as carbon pricing schemes and renewable portfolio standards for green buildings and sustainable city planning may not be adequate and efficiently adopted in practice for delivering the United Nations' Sustainable Development Goals (SDG). Building design features should promote human well-being and decarbonisation through the state-of-art adoption of sustainable solutions in the built environment. This also requires industry stakeholders' engagement and involvement in the environment, social and governance (ESG), and sustainability initiatives. Circular initiatives and people-centricity features should transform the delivery system of sustainable buildings. This theme invites novel solutions and case studies of liveable and resilient cities from all over the region.

Integrative & Collaborative Project Delivery

Would this integrative and collaborative project delivery have implications for future sustainability and has become a key area to promote low carbon emission projects? Integrative and collaborative aims to optimise the benefits of collaborative working in construction project delivery. New technologies emerged pledge to deliver efficiency, cost savings, and productivity increases to the construction industry. The application of building information modeling (BIM) also drives the construction industry for more integrative and collaborative project delivery. Would the integrated project delivery and effective integration strategies enhance connectivity and collaboration between major stakeholders? This theme invites all industry practitioners and academia to share their views, experience, and best practices to pursue the drivers for effective collaborative working in construction project delivery.

Construction Materials for a Low-Carbon Future

Modern green buildings consider low-carbon options like green concrete, recycled steel, or mass timber. However, making the exact right choice is not an easy thing. Buildings should be designed and materials selected based on the balanced consideration of the embodied energy with factors such as climate, availability of materials, and transport costs. This theme invites novel ideas and solutions for low-carbon building and construction materials and technology and the whole life cycle of the built environment. Topics may include but are not limited to novel low-carbon materials production and pricing, material reuse and recycling, green demolition and reconstruction materials, and low-carbon refurbishment and retrofitting.

More details at **https://paqs2023.com/**

OVERVIEW OF PAQS CONGRESS 2023 KUALA LUMPUR

Attendance **289** Malaysian **221** Non-Malaysian

The Pacific Association Quantity Surveyors (PAQS) Congress 2023 was held at the Berjaya Times Square Hotel, Kuala Lumpur from 22 to 26 September 2023.

The pre-congress sessions commenced from 22 to 24 September 2023, followed by the main congress from 25 to 26 September 2023.

For the pre-congress sessions that spans 3 days from 22 to 24 September 2023, a two-day Young QS Programme, the International QS Academic Forum (IQSAF), PAQS Committee Meetings, PAQS Golf, PAQS Board Meeting, and President's Dinner were held.

For the main congress held from 25 to 26 September 2023, there were 4 keynote speeches, 7 plenary speeches, and 22 papers presented throughout the parallel sessions. There were 285 Malaysian Delegates and 224 Non-Malaysian delegates. For spouses and accompanying persons who were not joining the main congress, they had the opportunity to participate in the 2-day Spouse Programme to tour within the Kuala Lumpur City. To wrap up the PAQS Congress 2023, all delegates were invited to join the Gala Dinner where it was a PAQS tradition to have every PAQS country member to stage a performance of their choice.

PAQS Board Meeting at the Berjaya Times Square hotel, Kuala Lumpur

Flags of PAQS Country Members in the PAQS Board Meeting room

YOUNG QS PROGRAMME

The Young QS Programme is one of the Pre-Congress Sessions which was held starting from Friday, 22 September 2023. There are 27 Young QS from 9 country members i.e. Malaysia, New Zealand, China, Hong Kong, Singapore, Brunei, Philippines, Japan and Sri Lanka attended the 1st Day Programme, which constitutes as a Formal Young QS Programme.

There were no representatives from Australia, Indonesia, Canada, Fiji, South Korea and South Africa.

The programme was started with the welcoming remarks from PAQS Chair (Prof. Chitra Weddikkara), PAQS Deputy Chairman (Prof. Anthony Mills), Chair of Organising Committee PAQS Congress 2023 (Sr Nazir Muhamad Nor) and Chair of PAQS YQS Group 2023 (Ms. Wong Yi Min). After that, all the delegates were divided into 4 teams for Ice-Breaking Games. The delegates were excited and participated together in all 3 types Ice-Breaking Games.

Each country's delegates also were required to do presentation related to sustainable development infrastructure projects focusing on the latest technology, challenges and future of the industry. There were total 9 country presentations including round-up presentation from RISM before the Exchange Gifts Giving Ceremony. The delegates returned to Berjaya Times Square for casual dinner. The 1st Day Programme ended with Laser Tag Battle League Tournament which was finished by 10.30pm.

Young QS Programme: Day 1 Meeting at RISM Boardroom

Young QS Programme: Day 1 Laser Tag Battle League Tournament

After the formal programme for Young QS, for the 2nd Day, all the delegates were taken to SUKE Expressway Operation Building for the Technical Visit. The visit was hosted by PROLINTAS, the largest Urban Highway provider in Klang Valley. The Technical and Contractual sharing sessions of the construction & completion of SUKE Expressway were given by the PROLINTAS representatives. After the session, all the delegates were taken to De.Wan 1958 Restaurant @ The Linc, Kuala Lumpur for lunch. The journey to De.Wan 1958 Restaurant passed by both SUKE and AKLEH Expressways which also owned by PROLINTAS.

After the lunch, the programme continued with the Technical Visit to newly completed PROLINTAS Rest & Services Area (RSA) Elmina at Guthrie Expressway. The delegates had the opportunity to try Satay Kajang, traditional Malay Kueh and Coconut Shakes. There was a Photograph Session between all delegates and PROLINTAS representatives at the RSA Elmina which marked the end of the 2nd Day Programme.

Young QS Programme: Day 2 Technical Visit to SUKE Expressway hosted by PROLINTAS

Young QS Programme: Day 2 LED Display Board on SUKE Expressway "2023 PAQS Delegates to SUKE/PROLINTAS"

INTERNATIONAL QUANTITY SURVEYING ACADEMIC FORUM (IQSAF 2023)

IQSAF 2023 held at Heriot-Watt University Malaysia

The International Quantity Surveying Academic Forum (IQSAF) was held on Saturday 23rd September 2023 in Putrajaya Malaysia. The forum was jointly organised by the RISM and Heriot-Watt University Malaysia (HWUM) in conjunction with PAQS 2023.

Attended by more than 120 delegates, from over 14 countries participated in the half day forum with a distinct keynote speech by Professor Mushtak Al Atabi, Provost HWUM, Sr Dr Suraya Ismail, Director of Research Khazanah Research Institute (KRI) and Associate Professor Sr Dr Noushad Ali Naseem, Massey University New Zealand.

IQSAF 2023 offers a unique opportunity to discuss the QS's roles and responsibilities in building sustainable infrastructure by designing infrastructure in ways that will bring and maintain sound sustainable development while also protecting vital natural resources and the environment. The forum covers a range of themes in different focus areas including Green Procurement, BIM and Green Supply Chain, Green As Business Competitive Advantage and Roles of QS in implementing SDGs. The forum moderated by Sr Dr Wan Maimun Wan Abdullah provides significant insights, best practices and project lessons learnt by prominent panellists which include Professor Dr Anthony Mills, Professor Sr Dr Abdul Ghani Khalid, Mr Martin Bisset, Dr Eugene Seah and Dato Sr Peter Tan.

IQSAF 2023 held at Heriot-Watt University Malaysia

PAQS GOLF 2023

The PAQS Golf Tournament 2023 was held on Saturday afternoon with a total of 24 players.

The play was smooth, joyful, and the weather was kind to the players. The game ended with a dinner and prize giving. Dato Jaafar Shahidan emerged as the champion for this tournament

IQSAF 2023 held at Heriot-Watt University Malaysia

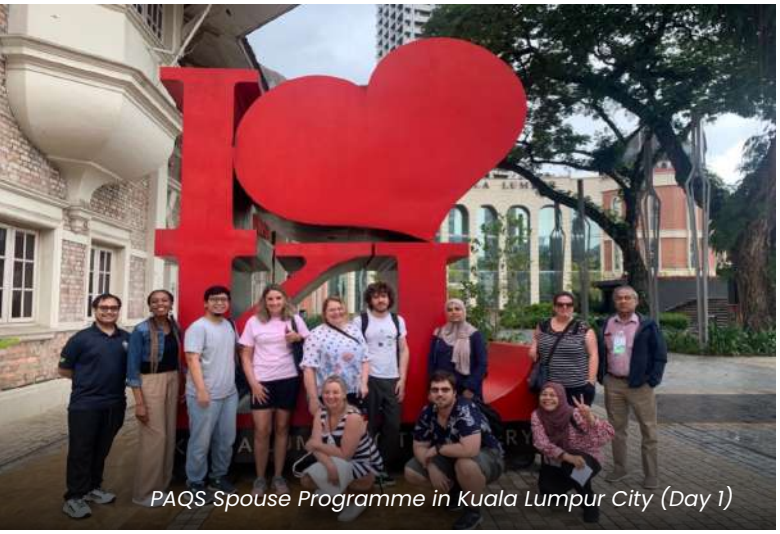
PAQS Golf at Glenmarie Golf and Country Club, Shah Alam

SPOUSE PROGRAMME

PAQS 2023 included a 2-days program for the congress participants' accompanying person. Guests experienced the best of Kuala Lumpur with a tour of the city's highlights with a licensed tourist guide.

The tour revealed Malaysia's unique multi-ethnic and multi-religious background by exploring a Chinese temple, a Hindu temple, a beautiful mosque and a church.

There were a mixture of 9 participants from 6 different countries which are New Zealand, Canada, Sri Lanka, Ireland, South Africa and Australia.



PAQS Spouse Programme in Kuala Lumpur City (Day 1)

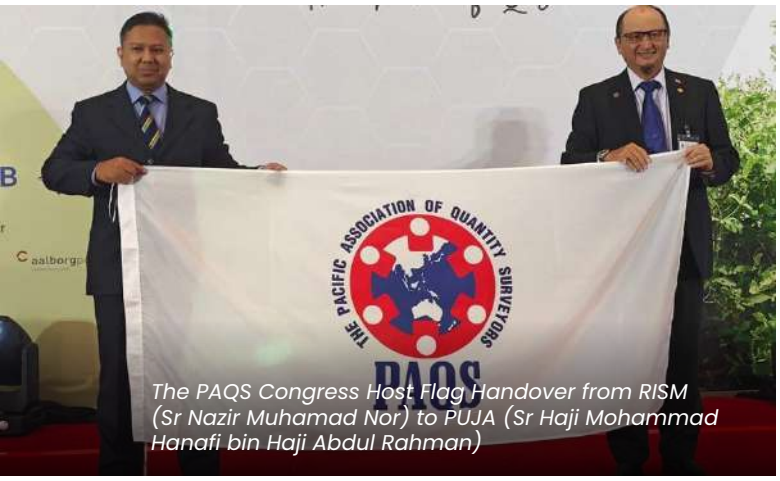
PAQS Spouse Programme in Kuala Lumpur City (Day 2)

Handover PAQS Chairmanship from Professor Chitra Weddikkara to Professor Anthony Mills

The exchange of Memorandum of Understanding was conducted between the Nigerian Institute of Quantity Surveyors (NIQS) represented by the NIQS President, Mr. Shonubi Michael Olayemi and the Royal Institution of Surveyors Malaysia (RISM) represented by the RISM QS Division Chair, Sr Nazir Muhamad Nor.

Exchange of MoU between NIQS (Mr Shonubi Michael Olayemi) and RISM (Sr Nazir Muhamad Nor)

The PAQS Congress Host Flag Handover from RISM to PUJA. Sr Nazir Muhamad Nor, the PAQS 2023 Organising Committee Chairman, handing over the PAQS flag to Sr Haji Mohammad Hanafi bin Haji Abdul Rahman, the PUJA President. PUJA will be hosting the PAQS 2023 Congress and Sr Hajah Hajijah binti Awg Haji Salleh, the PUJA Vice President and Chairperson of Surveyor Division, is the PAQS 2024 Organising Committee Chair.



The PAQS Congress Host Flag Handover from RISM (Sr Nazir Muhamad Nor) to PUJA (Sr Haji Mohammad Hanafi bin Haji Abdul Rahman)

Main Congress at Manhattan Ballroom, Berjaya Times Square Hotel

Plenary Paper 1 - Sr Eugene Seah (Singapore) "Proposed Roadmap for the QS contribution to decarbonisation"

Keynote 1 - Sr Dr. Ong See Lian, Turner & Townsend, Kuala Lumpur, Malaysia: "Sustainable Development – Let's Walk the Talk"

Keynote 3 - Associate Professor Sr Dr. Noushad Ali Naseem (New Zealand) "Chat-GPT – Awesome or Fearsome?"

The arrival of the Guest of Honour, Professor Chitra Weddikkara, Chair of PAQS accompanied by the President of Royal Institution of Surveyors Malaysia, Sr Adzman Shah bin Mohd Ariffin, Chairman of PAQS 2023 Organising Committee, Sr Nazir Muhamad Nor and Country Head of Delegates

Parallel session at Manhattan Ballroom

Parallel session at Bronx V

GALA DINNER

The Country members were encouraged to do country performance during the dinner of which most countries had performed.

This is the pinnacle of the PAQS Congress 2023. Apart from sumptuous meal by BTS Hotel, the delegates were enjoying themselves with the country performances. There were also numbers of awards presentation to the winners, locally and internationally. The winners and their accolades are as follows:

PAQS Service Excellence Award

Mohamad Shazali bin Sulaiman
(RISM) (Malaysia)

Colin Kin
(SISV)(Singapore)

Marilyn Moffatt
(NZIQS) (New Zealand)

PAQS Gold Medal Award

Wong Kin Hoong
(SISV) (Singapore)

Academic Excellence Award

Danie Hoffman
(ASAQS) (South Africa)

Organising Committee Members at the Gala Dinner (Malay Wedding Themed)

7th SABAH INTERNATIONAL SURVEYORS' CONGRESS 2023

The 7th Sabah International Surveyors Congress (7SISC), congress took place from 4th to to 5th October 2023 at Magellan Sutera, Kota Kinabalu, Sabah. We have invited & graciously accepted by the Sabah Chief Minister YAB Datuk Seri Panglima Hj. Hajiji bin Hj. Noor as our Guest of Honour but was represented on the day by the Minister of Industrial Development & Entrepreneurship (MIDE), YB Tuan Phoong Jin Zhe who gave us the keynote address & thereafter launched the congress.

With a focus on "Navigating the Future", this congress gathered more than 300 participants, including Surveyors from 4 disciplines, Academics, Industry Professional and students, enriched the event with their expertise. The notably 30 students were sponsored by RISM Sabah to attend this significant event reflecting a commitment by RISM to nurturing the next generations of surveyors & promoting their active participation in the industry. The event also hosted 15 exhibition booths, showcasing the latest advancements, tools, and services in the surveying field.

Topics & follow up discussions emphasised the pivotal role of emerging technologies and geospatial innovations in the surveying profession as well as encouraging surveyors to embrace change, adapt to evolving industry demands, lead transformation in their respective fields, and rebuilding the work force through the transformative concept of virtuous leadership.

The event was concluded with a prestigious 39th RISM Annual & Installation Dinner with the Guest of Honour, Sabah State Secretary YB Datuk Seri Panglima Sr Safar bin Untong gracing the evening.

The 7SISC, held successfully post-pandemic demonstrated the resilience & adaptability of the surveying community. It served as a platform for knowledge-sharing, networking, the exploration of emerging technologies and reinforced the commitment to nurturing the next generation of surveyors. The successful organisation of this event bodes well for the future of the surveying profession as it continues to evolve and meet the challenges of the modern world.

HYBRID CONFERENCE
RISM INAUGURAL ADR CONFERENCE
– EFFECTIVE DISPUTE RESOLUTION STRATEGIS FOR SURVEYORS

GUEST OF HONOUR ADDRESS
BY THE HON. JUSTICE
DATO' Sr LIM CHONG FONG

First and foremost, I wish to thank the Royal Institution of Surveyors Malaysia, in particular Sr Dainna Baharuddin for inviting me as well as my Chief Justice, YAA Tun Tengku Maimun Tuan Mat for graciously consenting to me presenting this Guest of Honour address here. It is indeed an honour and privilege.

The topic of today's conference is Effective Dispute Resolution Strategies for Surveyors.

INTRODUCTION

It is given that disputes are prevalent in the property and construction industries, especially the latter.

These disputes arise due to mismatch of expectations and consequently breach of promises and obligations.

It is also a given fact that everyone craves for dispute avoidance, failing which a dispute resolution which is effective, speedy and economical will be required. Ultimately, everyone expects a just and fair result to be meted out.

This address is merely to give an outline overview of dispute avoidance and dispute resolution as well as the opportunities for surveyor's involvement based on my experience. I hope this will in turn set the stage and provide food for thought, discussion and deliberation in the various sessions lined up for the rest of the day. Effective strategies in dispute resolution particularly case strategies cannot be learnt in a day and it takes years or even a life time of regular exposure and involvement in dispute resolution work. It is a truism that dispute resolution is case sensitive dependent upon the interaction of technical facts, evidence and law.

DISPUTE AVOIDANCE

It is always better to have dispute avoidance than having to be engaged in dispute resolution although this can often be inevitable. Most disputes in the property and construction industry are contractual and occasionally tortious in nature.

The contractual disputes stem from the contract, particularly construction contracts where the quantity surveyor has a hand in preparing them. The principal contracts in the property industry are statutorily prescribed particularly by the Housing Development (Control & Licensing) Act 1966 ("HDA") and the be-spoke property industry contracts such as those for sale of commercial properties that are not governed by the HDA. Wheras construction industry contracts are be-spoke with standard form construction contracts prepared by professional institutions such as PAM, IEM, etc. for the contracts used at the higher tiers of the construction contracting pyramid.

My experience reveals that many of these be-spoke contracts are not well drafted; thus giving rise to ambiguities, uncertainties and inconsistencies in interpreting the terms. There are often also modifications made to standard form construction contracts too that contribute to the problem.

The strategy for the surveyor in achieving dispute avoidance is therefore to have a thorough understanding of the commercial/project transaction and ensure that the be-spoke construction contracts are expertly drafted with clearly defined allocation of obligations, risks and remedies. The surveyor involved in administering the contract should also ensure that the contract is performed in accordance with the contractual intents as defined therein.

That notwithstanding, the traditional construction contracts are often lop-sided in respect of assumption of risks and adversarial performance wise. This has repeatedly proven to be the recipe of contractual disputes. Since the new millennium, there is the move towards collaborative or partnering construction contracts globally to avoid disputes. YA Dato' was heartened to note that the CIDB has just launched its standard form of collaborative construction contract and is aggressively promoting it around the nation. Surveyors especially the quantity surveyors are encouraged to be familiar with them which is likely to become the new norm of Malaysian constructing contracting.

DISPUTE RESOLUTION

Dispute resolution is needed when dispute avoidance fails and dispute resolution is resorted in the property and construction industries.

The traditional forum of dispute resolution in Malaysia is the court of law as provided in the Federal Constitution and the Courts of Judicature Act 1964 and Subordinates Court Act 1948 made thereunder. It is well known that the courts are inundated with caseload with a huge backlog of cases before the advent of the new millennium.

Thus over the years, alternative dispute resolution (ADR) (that is alternative to court litigation) became necessary and popular. The alternative dispute resolution modes for property industry disputes are through the statutorily created tribunal for homebuyer claim and strata management tribunal established under the HDA and Strata Management Act 2013 respectively. As for construction industry contractual disputes, the alternative dispute resolution modes are arbitration which is governed by the Arbitration Act 2005, statutory adjudication which is governed by the Construction Industry Payment and Adjudication Act 2012 ("CIPAA") and mediation which is governed by the Mediation Act 2012. There is also the specialist construction court which is a division of the High Court which has been operational in Kuala Lumpur and Shah Alam in 2013.

Surveyors who are keen to be involved in dispute resolution must have a proficient working knowledge of all these modes of dispute resolution and their practice and procedure (perhaps focusing on one or more of them) as well as their pros and cons respectively.

For construction industry dispute resolution, YA Dato' Sr has written a paper titled "Arbitration, statutory adjudication or litigation in the construction court" which is presently still accessible in the internet via www.mondaq.com. This paper is a comparative analysis of the aforementioned three modes of dispute resolution. The paper has also concluded that statutory adjudication is the swiftest but the decision is only of temporary finality and challengeable finally in arbitration or litigation in the construction court. Arbitration is more expensive than litigation in the construction court but the arbitral award is of worldwide enforcement via the New York Convention. Arbitration used to be faster than litigation in court but is not necessarily so now since the establishment of the specialist construction court.

There were 3800+ and 1200+ cases registered in the Kuala Lumpur and Shah Alam Construction Courts respectively on construction dispute resolution caseload involved in this decade. There were 4700+ CIPAA adjudication and 640+ arbitration cases registered in the Asian International Arbitration Centre (AIAC) respectively. There were also arbitration cases conducted ad-hoc and by the Pertubuhan Akitek Malaysia (PAM) as well as the Institution of Engineers Malaysia (IEM) and the statistics to be further updated.

There were occasionally also mediations undertaken to resolve property and construction industry disputes but they are not popular and widespread particularly because of their nature and complexity. There is no statistics of these mediations undertaken ad-hoc but anecdotally there were numerous undertaken by way of court annexed mediation in court pre-trial. Consequent to the Covid outbreak in 2020, there was also the statutory mediation scheme set up to resolve construction disputes thereby pursuant to the Temporary Measures for Reducing The Impact of Coronavirus Disease 2019 (Covid-19) Act 2020. That notwithstanding, Master Builders Association Malaysia (MBAM) has established its mediation bureau to promote construction mediation to resolve disputes amongst their members. The CIDB is recently also reviewing its mediation rules to re-promote construction mediation on a national basis to resolve construction disputes.

OPPORTUNITIES FOR SURVEYORS IN DISPUTE RESOLUTION

YA Dato' Sr had presented a paper titled "Opportunities for Surveyors in Dispute Resolution" this at the QS National Convention 2003 which is accessible in the internet at ukurbahan-qs.blogspot. Surveyors are traditionally involved in the dispute resolution process as factual witness to testify at the dispute resolution process, typically in court or arbitration on the project they are involved in which has gone sour. Occasionally, they may be involved as expert witnesses to provide property and construction valuation opinions. The paper has advocated five distinct roles where surveyors particularly quantity surveyors can activtely participate in the dispute resolution process and as follows:

(i) As an expert witness in other fields besides valuation such as construction delay claims and construction defect claims. I am not aware of any course that prepares one to undertake this role but I believe this is mostly learnt on the job in a claims consultancy and from textbooks and technical literature;

(ii) As a party representative representing a party principally in CIPAA adjudication and arbitration. It is essential to have a good working knowledge of construction law and dispute resolution process and this can perhaps be acquired through the forthcoming MSc programme offered by the Construction Industry Law Centre of the School of Housing Building and Planning, Universiti Sains Malaysia. The surveyor may eventually want to re-qualify as a lawyer (just as I did) and undertake property and construction litigation in the courts, especially in the construction court. In this regard, you will be able to get a flavour of it from my book titled The Malaysian Specialist Intellectual Property and Construction Courts – Practice & Procedure published by Thomson Sweet & Maxwell in 2020;

(iii) As a mediator to mediate disputes arising from the property and construction industry such as tenancy and strata property disputes as well as construction contract disputes. It is essential to acquire a mediation qualification and this may be obtained perhaps via the CIDB mediation accreditation course which I expect will be soon re-launched following the re-vamp of its mediation rules;

(iv) As a CIPAA adjudicator to adjudicate construction payment disputes. It is compulsory to have at least 7 years of professional experience and thereafter undergo and pass the adjudication course run by the AIAC to qualify as its panel adjudicator and

(v) As an arbitrator to arbitrate property and construction industry disputes. It is generally essential to obtain the qualification meted by The Chartered Institute of Arbitrators, ideally to attain the fellowship grade to be empanelled with the various arbitral institutions including the AIAC.

These five roles are not exclusive and it is not unusual for the person to be active in a combination of them. Aside from these principal five roles, there are also other less commonly utilized roles of alternative dispute resolution such as expert determination, contractual dispute review board, etc.

CONCLUSION

YA Dato' Sr has confidently said that this is a field which is often satisfying, intellectually demanding, work-wise always stimulating, generally well paying but never dull in his near 40 years of experience in construction and dispute resolution. YA Dato' Sr has encouraged those beginners or those interested should join the RISM ADR committee so as to keep abreast with the developments.

ABOUT THE EVENT

As RISM's effort to move forward Alternative Dispute Resolution (ADR) within the fraternity, we are organising RISM Inaugural Effective Dispute Resolution Strategies for Surveyors which will be held on 17 October 2023, Tuesday, 9.00am-5.30pm at Asian International Arbitration Centre, Kuala Lumpur.

In the welcoming remarks by Sr Hj. Adzman Shah Hj. Mohd Ariffin, President of the Royal Institution of Surveyors Malaysia, we were reminded of the importance of knowledge sharing, collaboration, and discovery within our community. His message set the tone for this event, emphasizing unity and the pursuit of excellence in our field.

The Guest of Honour, The Hon. Justice Dato' Sr Lim Chong Fong, Court of Appeal Judge, highlighted the significance of this event and the honour it brings to our gathering. His presence underscored the importance of the topics discussed and the impact of dispute resolution on our legal system. Some of the key points in Yang Arif's remarks also shared his view on what it takes to be involved in the realm of dispute resolution and how dispute avoidance is more meaningful. Yang Arif also offered sound advice to those surveyors aspiring to capitalise the opportunities by taking up 5 of the roles in dispute resolution.

In the Keynote Address by YBhg. Datuk Professor Sundra Rajoo, Director of the Asian International Arbitration Centre (AIAC), we gained valuable insights into the development of technology, construction, and dispute resolution. Datuk also shared his excitement to be rekindling connection with the professionals, especially those construction industry, especially the surveyors. Datuk also looks forward to having more such events with RISM next year and many more to come. Datuk also share his take on the nuances between conflict avoidance, settlement, and resolution.

Datuk also shared his take on compliance requirements for ESG, human rights and governance standards. Datuk advised surveyors to look into addressing these when drafting contracts to avoid disputes from ESG and disruptions from other emerging trends. On a lighter note, Datuk also shared his experience in establishing AIAC at its current premises and products available from AIAC in dispute resolutions, including the suites of AIAC standard form of contracts and rules for arbitration, mediation, and adjudication to suit the parties' requirements.

This event will involve presentations from eminent professionals apart from high profile and renowned panelists and moderators.

ADR Conference Objectives:

1. **Promote Effective Dispute Resolution in Surveying:** The primary objective of the RISM Inaugural Effective Dispute Resolution Strategies for Surveyors Conference is to promote and advance effective dispute resolution practices within the surveying profession. This includes exploring strategies, best practices, and emerging trends in dispute resolution specific to the field of surveying.

2. **Knowledge Sharing and Capacity Building:** Facilitate knowledge sharing and capacity building among surveyors and professionals in related fields by providing a platform for experts to share their insights, experiences, and expertise in dispute resolution processes.

3. **Professional Development:** Offer attendees an opportunity to enhance their professional development by gaining a deeper understanding of the legal and practical aspects of dispute resolution, particularly as they pertain to surveying and related industries.

4. **Networking and Collaboration:** Foster collaboration and networking among surveyors, legal professionals, arbitrators, adjudicators, and mediators to create a supportive and collaborative community for addressing disputes in the surveying sector.

5. **Highlight Industry Expertise:** Showcase the wealth of expertise within the surveying community and its contribution to effective dispute resolution, ultimately elevating the profession's profile in this critical aspect of project management and construction.

6. **Engage with Key Stakeholders:** Encourage engagement and dialogue between surveyors, regulatory bodies, government agencies, and other stakeholders involved in the construction and property sectors to explore opportunities for improved dispute resolution practices.

These objectives collectively aim to enrich the knowledge and skills of attendees, promote constructive dialogue, and ultimately contribute to more efficient and fair dispute resolution processes within the surveying profession.

The hybrid conference received an overwhelming response, despite it was the first ever hybrid ADR Conference organised. The total registered participants of the conference were 589.

RISM

SCHOLARSHIP FUND

RM6,000.00 per annum

Field of Study:

- **Geomatics & Land Surveying**
- **Quantity Surveying**
- **Property Surveying**
- **Building Surveying**

Eligibility & Criteria

- Malaysian citizens pursuing Diploma or Degree programs in the field of surveying at local institutions of higher learning.
- The applicant must be at least age of 18 years old to apply for RISM Scholarship Fund.
- Winners from Young Achievers' Award (YAA) were awarded the Pledge of scholarship for enrolment to Surveying Courses in local institutions of higher learning.
- Candidates must be pursuing either diploma or degree courses in fulltime basis which are accredited by RISM.
- Candidates must apply within 2 months after commencement of the first semester at local institutions of higher learning.
- Candidates must maintain CGPA of not less than 3.25 for each semester and throughout the entire duration of the course to be eligible and retain the scholarship.

RISM Study Incentives

Dependents of RISM members and staff are eligible to apply

- 5 A's and above for Sijil Pelajaran Malaysia (SPM): **RM500.00**
- CGPA 3.0 and above for Sijil Tinggi Pelajaran Malaysia (STPM): **RM800.00**
- Eligible for the top 3 individual performers of RISM Young Achievers' Awards: **RM500.00**

Remark

- The organizer reserves the right to change these terms and conditions at any time at its discretion.
- Term and conditions apply.

APPLY NOW

The application form can be downloaded at website: **https://rism.org.my/scholarship/** and completed form to be emailed to **secretariat@rism.org.my**

or **submit to the address below**:

The Chairman
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Tel: 03-7955 1773/7954 8358 **website: www.rism.org.my**

Hearties Congratulations

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ROYAL INSTITUTION OF SURVEYORS MALAYSIA

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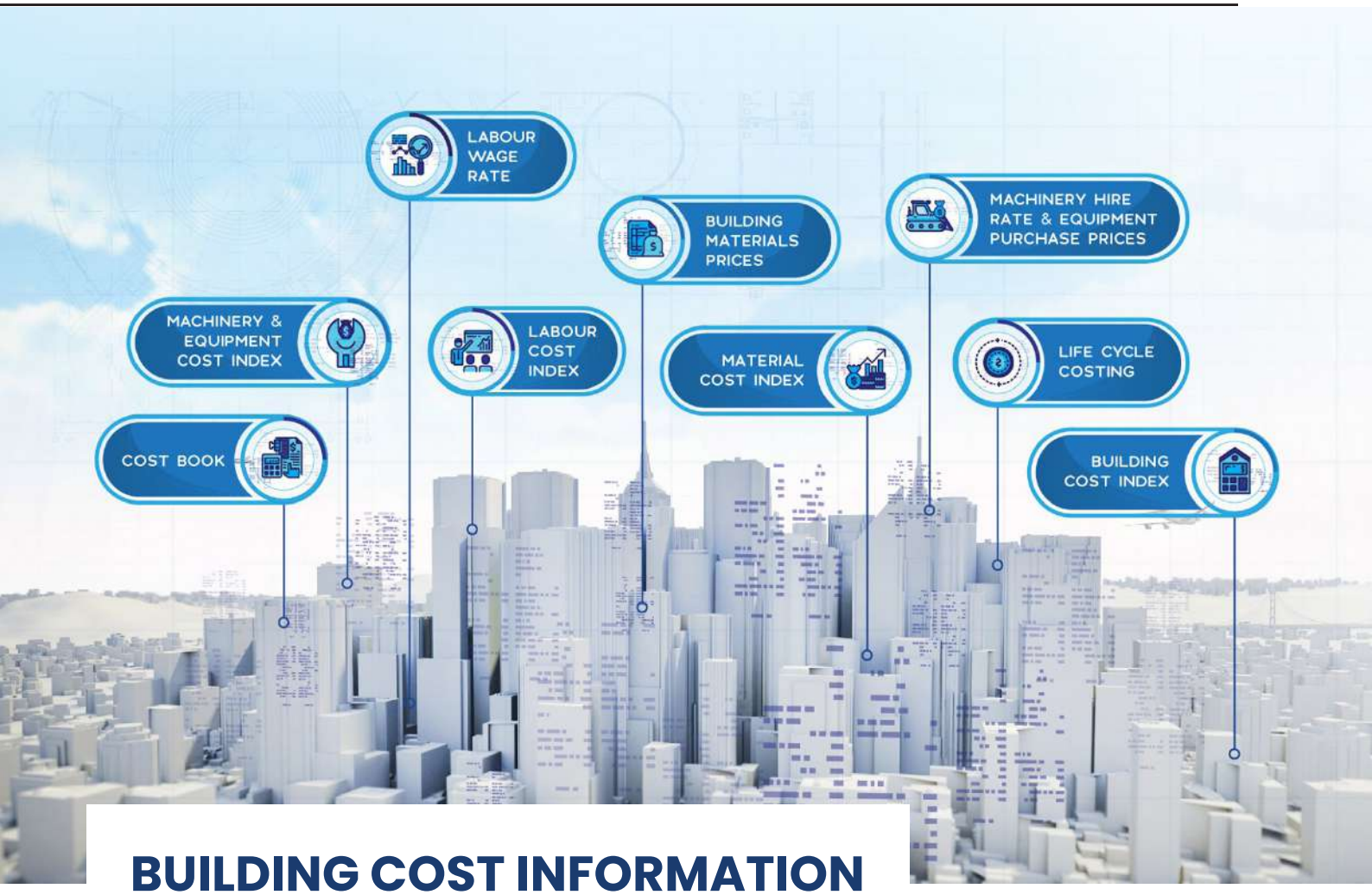

BUILDING COST INFORMATION SERVICES MALAYSIA (BCISM) TENDER PRICE INDEX

Tender Price Index (TPI) and its importance in the construction industry

The Tender Price Index (TPI) measures the price change for construction work tendered by contractors. It is used to track the price movements of construction work over time. It is an essential tool for contractors, clients, and stakeholders to monitor changes in the cost of construction work and to inform their decision-making. In addition, the TPI is an essential indicator of the construction industry's health. It provides valuable cost information and can help identify trends in the construction industry.

The TPI is important in the construction industry because it indicates the level of competition in the market and the cost of construction work. Contractors use it to adjust their tender prices to remain competitive and by clients to assess the value for money of construction work.

Overview of the Construction Industry in Malaysia

The construction industry in Malaysia is one of the key sectors contributing to the country's economic growth and development. It contributes to creating infrastructure, employment, income, and social welfare. However, the construction industry faces various challenges, such as rising costs, environmental issues, quality standards, and competitiveness. According to the Department of Statistics Malaysia, the value of construction work done in 2020 was RM 137.9 billion, a decrease of 19.4% from RM 171.1 billion in 2019. The main factors that affected the construction sector's performance were the COVID-19 pandemic and the implementation of the Movement Control Order (MCO), which disrupted construction activities and supply chains.

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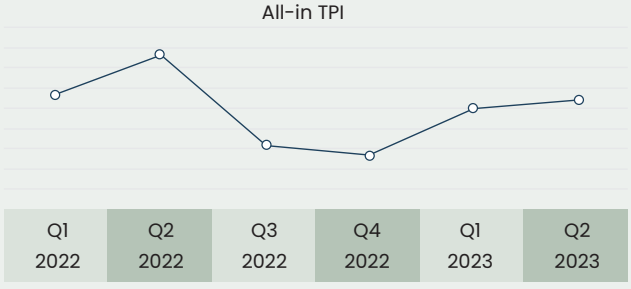
Furthermore, in Malaysian's construction industry, the infrastructure construction sector dominated. Investments in the infrastructure sector are expected to boost construction activity in Malaysia. The residential construction sector is also expected to drive the construction market, with an increase in residential construction. Furthermore, the residential and transport construction sectors have a huge potential for growth in the forecasted period, which stimulates opportunities for other market players. Despite near-term challenges in construction sectors, Malaysia's medium to long-term growth story remains intact.

One indicator that reflects the construction industry's cost performance is the Tender Price Index (TPI). The TPI measures the cost to the client in the previous quarter and is based on the rates in contract Bills of Quantities for building projects for which competitive tenders have been received. The TPI is influenced by various factors such as demand and supply conditions, material and labour costs, productivity and efficiency, quality and standards, risk and uncertainty, and market competition. The TPI can be used as a reference for estimating and budgeting purposes and for monitoring and controlling costs during project implementation.

According to the National Construction Cost Centre (N3C) portal, the All-in Tender Price Index experienced a slight rise of 0.25 per cent in the 2Q2023, compared to the 1Q2023. This resulted in a 1.67 per cent decrease in the TPI on an annual basis, from the 2Q2022. This indicates that the market was undergoing a transition, as both the demand and supply of construction work were slowing down.

Contractors faced more competition, but they also exercised prudence in selecting their projects. It was noted that the Ministry of Finance (MoF) reported the Malaysia's property market activity declined by 5.7 per cent in the 1Q2023, with a total of 89,000 transactions valued at RM42.31 billion, compared to the same period in 2022. However, the National Property Information Centre (NAPIC) also perceived that there was a marginal increase of 0.8 per cent in the total transactions in 1Q2023, compared to the 4Q2022. Meanwhile, the NAPIC also noted that the property market is likely to maintain a cautious optimism in 2023.

In general, based on the index, BCISM able to highlight some factors that could pose challenges to the market performance. One of these factors is the gradual increase in the overnight policy rate (OPR) by Bank Negara Malaysia since May 2022, which could affect the borrowing costs. Another factor is the construction sector faces labour shortages and rising costs of building materials due to supply chain disruptions and inflationary pressures. These issues could hamper the completion and delivery of new construction projects, as well as increase the prices of existing ones. Moreover, one of the main drivers of the construction sector's performance is the domestic economic and financial situation, which affects the demand and supply of building projects. Another important factor is the global economic and financial environment, which influences the trade and investment flows, the exchange rate fluctuations, and the commodity prices that affect the construction sector. For more information, get the latest trends and projections of prices, costs and indices from National Construction Cost Centre (N3C) portal.



Source: All-in Tender Price Index from National Construction Cost Centre (N3C) portal

N3C portal is an online platform providing accurate and precise construction cost Information which shares up-to-date pricing and indexes details such as Building Materials Prices, Labour Wage Rates, Machinery Hire Rates, Tender Price Index and other similar data.

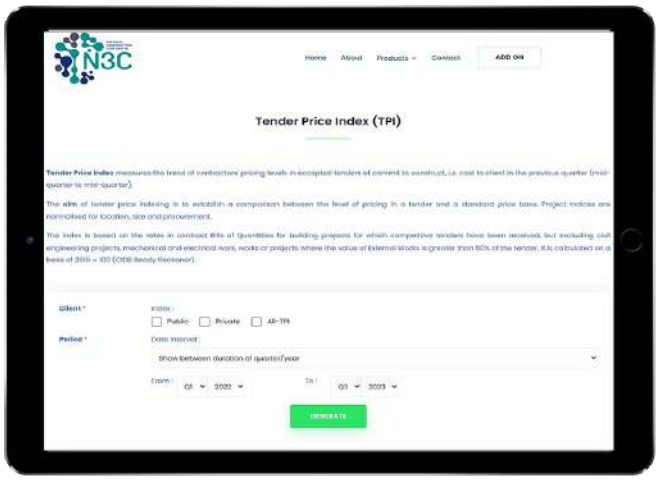
How TPI is calculated: BCISM Methodology

In essence, a comparison of some unit rates from each trade in the Bill of Quantities and their matching rates in the Schedule of Rates is needed to determine a project's tender price level. This comparison shows the variation of the unit rates among different trades and how they influence the total tender price level. This is BCISM's standard method of establishing the tender price level for a project. This method is suitable for projects based on Bills of Quantities or similar types of bids with quantities and rates that can be matched with the Schedule of Rates.

The BCISM generates a quarterly index that measures the average change in project tender prices over time. The index uses the geometric mean of the costs of competitive tenders that were accepted in each quarter. The data comes from CIDB, which collects Bills of Quantities for building projects that have received competitive bids. However, the index does not include civil engineering projects, mechanical and electrical work, or projects with over half of the tender value for External Works. The index uses 2016 as the base year and sets it to 100.

Furthermore, to qualify as a sampling project, three main criteria must be met:

- The project must be based on the original tender submitted before any changes are made after the tender process.
- The project must have a contract value that exceeds RM100k.
- The project must have quantified and priced work items.



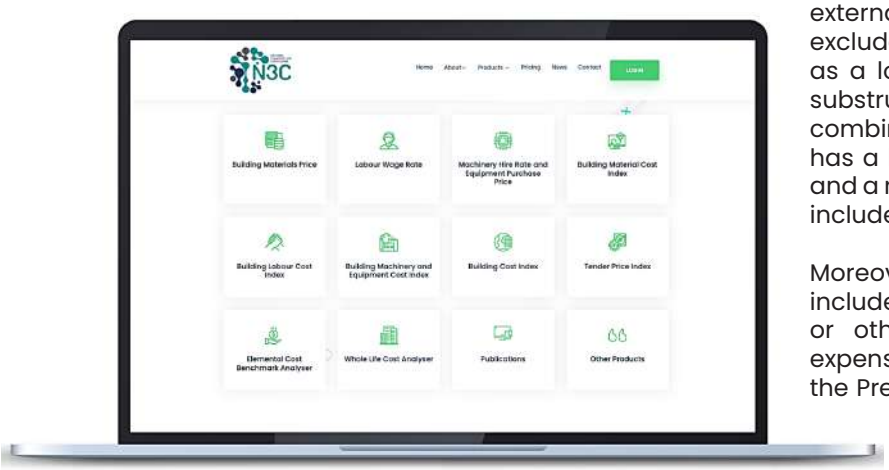
An excellent way to match similar items in the Schedule of Rates is to use a priced BQ that is based on the SMM2 standards. Indexing can be done for schedules of work and activity schedules, but it requires the indexer to apply his professional knowledge to make reasonable choices.

General Indexing Rules

The sampling procedure can only commence after the Elemental Bills have been transformed into the indexing trade order. Indexing aims to obtain a representative sample of the tender and compare it with a predetermined base. In the case of a project comprising more than one building, the building with the greatest value shall be selected for indexing. In some cases, the buildings in a multi-building project may have different construction methods and materials, affecting trade distribution across the BQ. If the rates and the construction types vary significantly, then a representative sample should include both buildings.

Suppose only one building from a multi-building project is sampled. In that case, the external works should be adjusted proportionally to balance the total project cost and the total value of external works. This means the trade values for external works should be scaled according to the buildings sampled. The index sample should only include external works directly related to the buildings and exclude any works outside the site boundary, such as a long access road or extensive drainage. The substructure and superstructure Bills should be combined into one Bill. For example, if the building has a basement (substructure) and an upper floor and a roof (superstructure), the index sample should include the works related to these parts.

Moreover, a common practice in some BQ is to include expenses such as water, insurance, fuel, or others as provisional sums. However, these expenses should be correctly classified as part of the Preliminaries Bill and added to the Preliminaries



accordingly. This would ensure a more accurate and consistent representation of the project costs. On the other hand, in some BQ, the main summary may include some adjustments for various factors, such as overheads, profit, or bill corrections. These adjustments should be distributed according to the instructions in the main summary. If there are no instructions, the adjustments should be applied evenly to preliminaries and measured work.

General Sampling Rules

wAs mentioned before, indexing is a process that allows comparing the tender rates with a fixed base (the Schedule of Rates). This enables the analysis of different projects and the computation of a quarterly tender price index. A precise comparison would require sampling every item in a BQ, but this is usually not feasible or possible due to proprietary products not being in the Schedule of Rates. For example, mechanical and electrical services cannot be sampled because sometimes they are not measurable for each project and are not included in the Schedule of Rates.

A 100% sample would be impractical and inefficient for the system, as examining every item would take too much time and resources. Statistical analysis showed that a reliable index value could be obtained by sampling the items with the highest extended value, which are the most influential in determining the overall value. The sampling process would stop when the total value of the sampled items reached 25% of the total value of all items. Sampling more items beyond this point did not significantly change the result, as they had lower extended values and less weight in the calculation. This method is acceptable for calculating a quarterly tender price index, which indicates the changes in the prices of tenders over time. Any errors in individual tender index levels would have minimal impact on the quarterly index, as the other tender index levels would average them out.

Tender index levels help measure the general trend of prices in the construction industry. Depending on the size and complexity of the project, a 25% sample of the rates may not reflect the actual cost variation among different tenders. Therefore, it is essential to use indexing to obtain a representative sample of the rates that cover the whole scope of the project. This may require selecting more than 25% of the rates for some trades, especially those with more extensive or diverse items. For example, suppose a project involves much structural work. In that case, indexing more than 25% of the structural rates may be necessary to capture the differences in materials, labour, and equipment costs among different tenders.

General Approach to Sampling

A BQ is a document that lists the items and quantities of work required for a construction project. In a BQ, each work item can be classified into a trade, a category of related activities. For example, concrete work, brickwork, roofing, and others, are different trades. Sometimes, a trade may have sub-trades that specify the type of work involved. For instance, concrete work may have sub-trades for concrete, formwork, and reinforcement. Each of those trades in a BQ is treated separately for indexing. Besides, the measured works in a BQ are supposedly based on the SMM2, a standard measurement method for building works. However, the BQ may not follow the SMM2 strictly and may have some variations depending on the project requirements. Therefore, defining the trades and sub-trades clearly is important before preparing for indexing. This will help to avoid confusion and errors in the sampling process.

When estimating the tender index level for a project, it is essential to sample the items that significantly impact the cost of the measured work. The measured work is the total amount of abstracted trades from the BQ. Items that have an extended value (the product of the quantity and rate) greater than 1% of the measured work total should always be sampled, as they can affect the tender index level considerably. For example, if the measured work total is RM 100,000, any item with an extended value of more than RM 1,000 should be sampled. On the other hand, items with an extended value of less than 0.1% of the measured work total are not worth sampling, as they have a negligible impact on the tender index level. For instance, if the measured work total is RM 100,000, any item with an extended value of less than RM100 can be ignored.

Lastly, the following steps are recommended for comparing the extended value items in a trade or sub-trade with the corresponding items in the Schedule of Rates: First, the item with the highest extended value in the trade or sub-trade should be identified, and the same item should be located in the Schedule of Rates. For example, if the trade is Concrete and the item with the highest extended value is Reinforced Concrete Grade 25, then the same type and quality of Reinforced Concrete should be taken in the Schedule of Rates. Then, this process should be repeated in decreasing value order until a representative sample of the trade or sub-trade is covered. A representative sample should include at least 25% of the trade value and cover all items worth more than 1% of the measured work total. A practical tip is to sample all the large items in a trade or sub-trade rather than switching between different trades. This will save time and effort and enhance the sample's quality and representativeness. For example, instead of sampling concrete, formwork, reinforcement, and concrete again, it is better to sample all Concrete items first, then all formwork and so forth.

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