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Royal Institution of Surveyors Malaysia

BERITA QS

Issue No.6, Session 2023/2024

“ In the construction world,
tools are important.
But the greatest tool you
have is your mind. ”

FOR MEMBERS ONLY

TABLE OF CONTENT



- PG2** SURVEYOR SOCIAL RESPONSIBILITY PROGRAM AT SMK SG. PUSU
- PG4** HYBRID SEMINAR – EINSTEIN’S CONTRIBUTION TO MODERNISING CONSTRUCTION CONTRACTS IN MALAYSIA
- PG9** THE IMPLEMENTATION OF MICROMOBILITY E-SCOOTERS AT UiTM PERAK BRANCH: PATTERN OF USAGE NUMBERS AFTER ONE YEAR OF ENCOURAGEMENT
- PG14** WEBINAR – BACK TO BASICS: BIM FOR QS
- PG17** PUBLICITY – MONTHLY ACTIVITIES
- PG18** QS ACADEMY
- PG19** BENEFITS OF GREEN PROCUREMENT: PERSPECTIVES FROM THE MALAYSIAN CONSTRUCTION INDUSTRY

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SURVEYOR SOCIAL RESPONSIBILITY PROGRAM AT SMK SG. PUSU

At SMK Sg. Pusu, Gombak, Sr Nazir Muhamad Nor had the esteemed privilege of representing the RISM-QS Division, contributing to the Surveyor Social Responsibility (SSR) program. In a concerted effort to bolster education, Sr Nazir facilitated donations earmarked for the procurement of books tailored for B40 and Orang Asli students. Additionally, computer contributions were extended to augment the resources available within the school library. The presence of key figures from the RISM-QS Division, including Sr Nazir Muhamad Nor as Vice President-QS, Sr Dr. Sarajul Fikri Mohamed, Chair of the SSR Sub-Committee, and Cik Zarinah from the Secretariat of the QS Division, underscored our commitment to this initiative.

The event witnessed the attendance of pivotal members from SMK Sg. Pusu, comprising the YDP of PIBG, the school principal, members of PIBG, and devoted educators. This collaborative endeavor serves as a testament to the shared dedication of both the RISM-QS Division and SMK Sg. Pusu towards fostering social responsibility and enriching educational resources.





HYBRID SEMINAR – EINSTEIN’S CONTRIBUTION TO MODERNISING CONSTRUCTION CONTRACTS IN MALAYSIA

Speaker : Associate Professor Sr Dr. Naseem Ameer Ali
Date : 24 January 2024
Time : 9.00 AM – 1.00 PM
Venue : Menara Star, 15 Jalan 16/11, Petaling Jaya, Selangor
Attendance : 300 participants
CPD points : 2 points (BQSM)

A. OVERVIEW

Construction contracts are considered by some to be complex. But they need not be. By the end of this seminar, participants would gain a good understanding of the following from most recent developments within Malaysia and from international experiences, including:

1. Good contract administration skills up within hours.
2. Contracts need not be complex.
3. Contracts can be easily understood by all primary users like clients, contractors, subcontractors, and contract administrators.
4. Contracts can equally be understood by secondary users like lawyers, claims consultants, and dispute resolvers like judges, arbitrators, adjudicators, and mediators.
5. Contracts can be written flexibly without the need for multiple standard forms with mostly repeated clauses.
6. Contracts can be written consistent with modern legislation in some countries such as the New Zealand Plain Language Act 2022.
7. The construction industry can benefit from heeding Einstein’s (paraphrased) advice: make everything as simple as possible but not simpler.

B. THE EVENT

The RISM-QS Academy hosted a seminar exploring how Einstein changed construction contracts in Malaysia. The event took place on January 24, 2024, and Associate Professor Sr Dr. Naseem Ameer Ali, the former President of RISM, was the main speaker.

With the theme "Now everyone can understand construction contracts," the seminar attracted 300 participants, both online and in person. Star Media Group co-organized the event, highlighting its importance, and L2-i-CON International provided substantial support. Representatives from various agencies, including MBAM, IEM, ACEM, MOSA, MISIF, PIFM, MERCY, MRL, SGPAM, DBKL, TNB, YTL, PERI, SUNWAY, CIDB, and more, attended, showcasing broad industry support.

The goal was to simplify construction contracts for a wider audience, and the hybrid format allowed 300 participants to join virtually or in person.

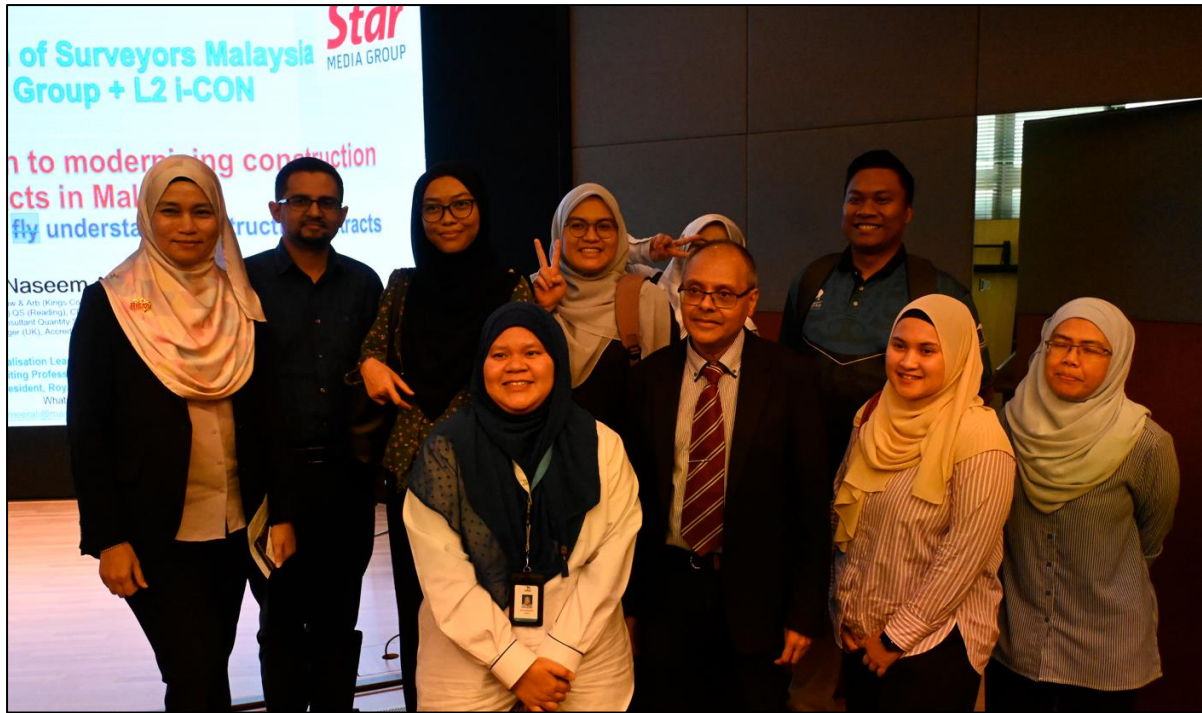
Associate Professor Sr Dr. Naseem Ameer Ali shared insights into Einstein's impact on modernizing construction contracts in Malaysia. The event was a collective effort to make construction contracts more understandable.

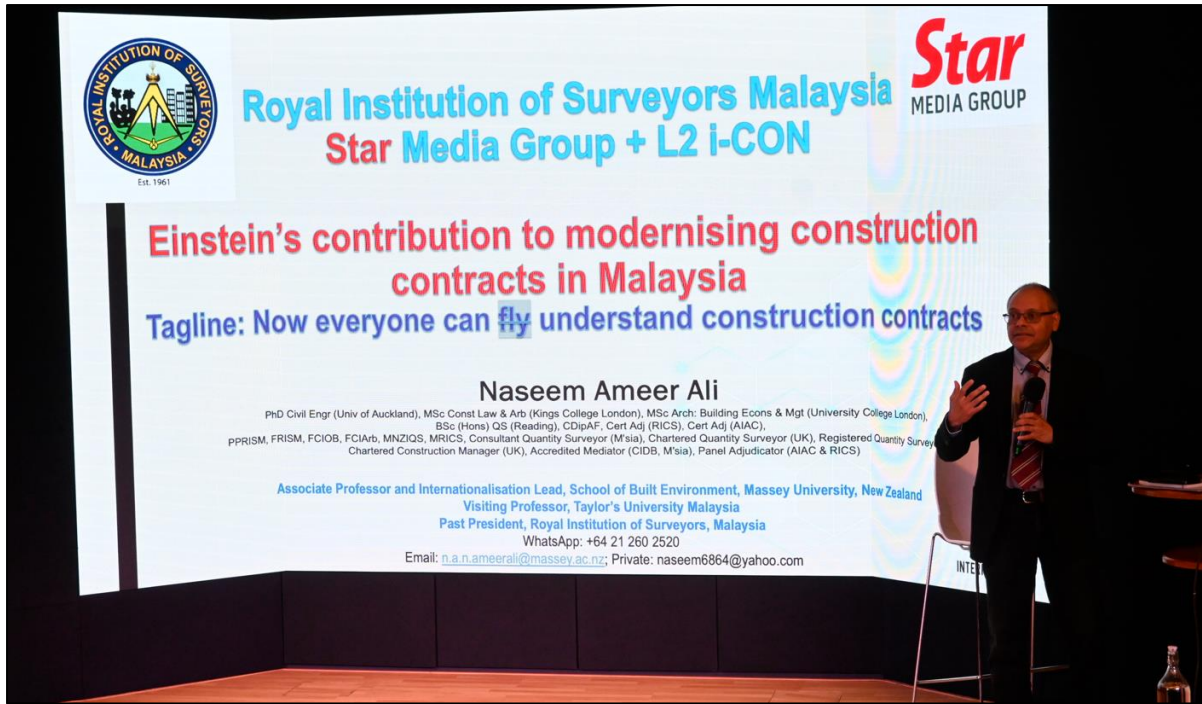
To visually capture the event's essence, attached are pictures showcasing engaging sessions and dynamic interactions among participants. This seminar marks a significant milestone in improving understanding of construction contracts in Malaysia.

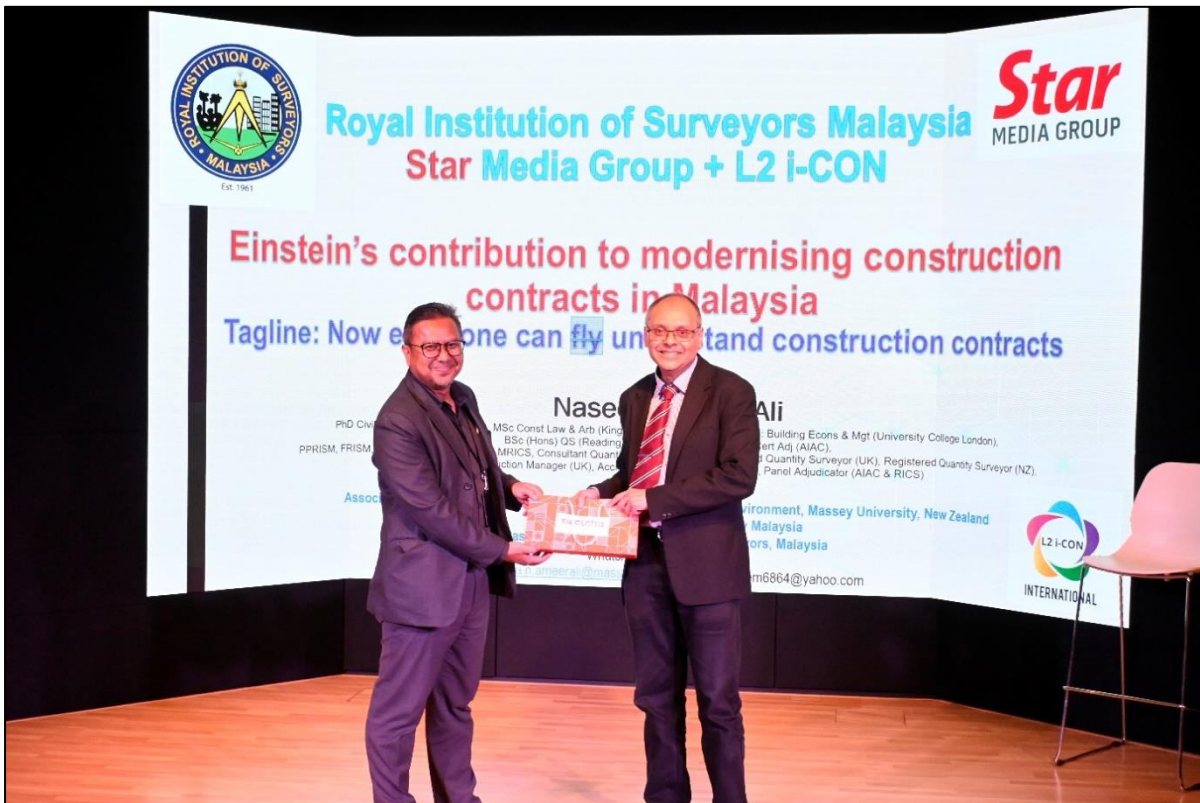
C. NOTES OF APPRECIATION

RISM QS Academy would like to extend its appreciation to Star Media Group for co-organizing the event and L2-i-CON International for providing substantial support in promoting the event.









THE IMPLEMENTATION OF MICROMOBILITY E-SCOOTERS AT UiTM PERAK BRANCH: PATTERN OF USAGE NUMBERS AFTER ONE YEAR OF ENCOURAGEMENT

INTRODUCTION

Micromobility e-scooters present numerous advantages, encompassing environmental sustainability and cost efficiency. In response to growing environmental concerns and escalating traffic congestion, e-scooters offer a sustainable means of transportation. Operated by electricity and systems, they contribute to a reduction in carbon emissions and mitigate air pollution. Furthermore, e-scooters represent a budget-friendly alternative, saving both money and time by eliminating the need for fuel and navigating through congested areas more efficiently especially in any student's life. These attributes render e-scooters appealing to urban commuters, students, and individuals seeking a convenient and eco-friendly mode of transportation. As the demand for environmentally conscious transportation continues to rise, e-scooters are gaining popularity as a viable option on a global scale. Other implementation objectives for sustainable transportation are first and last mile connectivity. Its represent the distance between housing, transit stop and working area. It is the requirement for a second mode of transportation to reach work and get back. This affordable option comes at much lower cost and convenience.

University scenario and behaviour related with requirement of students' movement from college, faculties and facilities. In the student's life, adherence to rules and regulations is crucial, particularly during the first year when bringing personal transportation is restricted. First and last mile concept can be represented by using micromobility e-scooter as a mode of sustainable and efficient transportation. Nevertheless, the university addresses this by offering designated parking spaces near the campus entrances and encouraging students to walk. This approach aims to alleviate congestion and reserve parking spots for university staff. In support of students, UiTM Perak branch has taken the initiative to provide e-scooters, facilitating their convenience and mobility.

BACKGROUND

One of its initiatives, geared towards environmental sustainability, eco-friendliness, and low-carbon initiatives, is the implementation of the Low Carbon Urban Mobility Solutions Project in Malaysia. Starting in 2022, collaboration with a Memorandum of Understanding (MoU) with Urbanice Malaysia, strategic partnership with Beam Malaysia Sdn Bhd. Urbanice Malaysia is a non-profit organization under the Ministry of Housing and Local Government. Established as a Center of Excellence since 2016, its objective is to make Malaysian cities sustainable, resilient, and knowledge-sharing hubs, serving as a strategic partner to various government and private agencies. Hence, the E-Scooter or Micro

Mobility Program, launched as part of the Green Campus initiative, commenced operations in December 2022. Throughout the year 2023, starting from January, numerous proactive programs have been implemented to familiarize students with and encourage the use of e-scooters as a convenient mode of transportation within the campus. Considering the strengths and advantages possessed by all parties involved, a smart collaboration can generate a significant impact in advancing low-carbon initiatives and achieving the goal of becoming a Green Campus. This, in turn, contributes to forming a high-quality green community to support the realization of national development policies and Sustainable Development Goals (SDGs).

THE E-SCOOTER ENCOURAGEMENT PROGRAMS BY THE MICRO-MOBILITY TEAM

The Micro-Mobility Team has conducted a series of coaching sessions on micromobility, specifically focusing on e-scooters. Various programs were organized, including a sharing session titled 'New Journey Towards Green Campus Initiatives for Green Transportation,' 'Wakaf Ilmu Series Micro-Mobility E-Scooter: A Travel Mode Innovation in University,' and 'The Briefing of E-Scooter to the New Students.' Additionally, active encouragement was extended through participation in university initiatives, such as the 'Get Fit Explorace' held in celebration of Malaysia's Independence Day, where 15 e-scooters were provided for free rides. Furthermore, the e-scooter program at UiTM Perak branch has been aligned with best practices, drawing inspiration from other organizations, both in the industry and academia.

Programs by initiatives for safety and pre-caution awareness have been conducted with in collaboration between Micro Mobility team and Beam Malaysia, each semester, dual Beam Safety Awareness Academy Program have been conducted. Focusing for new intake students during early semester, and all UiTM Perak community. Safety element, skills enhancement and guidelines for insurance users becoming a priorities during awareness program.

Sharing programs for e-scooters offer various advantages, including alleviating congestion and pollution, fostering sustainable transportation alternatives, and enhancing accessibility in urban environments. These initiatives have a favorable impact on the environment while providing a practical means for individuals to navigate their city.

THE BENEFITS OF E-SCOOTER

Electric scooters are transforming commuting practices, significantly influencing choices for sustainable transportation. The increasing prevalence of e-scooter sharing programs indicates a growing preference for this environmentally conscious mode of travel. E-scooter sharing programs present a convenient and eco-friendly substitute for traditional

transportation modes. For the students itself, this e-scooter will help them to move faster rather than walking from the parking spot the class. At the same time, opting for e-scooters contributes to the reduction of carbon emissions and the enhancement of air quality in campus settings. These programs motivate students to embrace sustainable transportation options by providing a cost-effective, convenient, and enjoyable means of travel around the campus. E-scooters have the potential to mitigate traffic congestion in campus due to their reduced space requirements on roads.

ANALYSIS AND TRENDS: ONE YEAR INTO THE IMPLEMENTATION OF E-SCOOTERS ON CAMPUS

Over the course of January to December 2023, several databases have been compiled. This section provides insights into (i) the overall number of trips within the campus and (ii) the total number of users on campus.

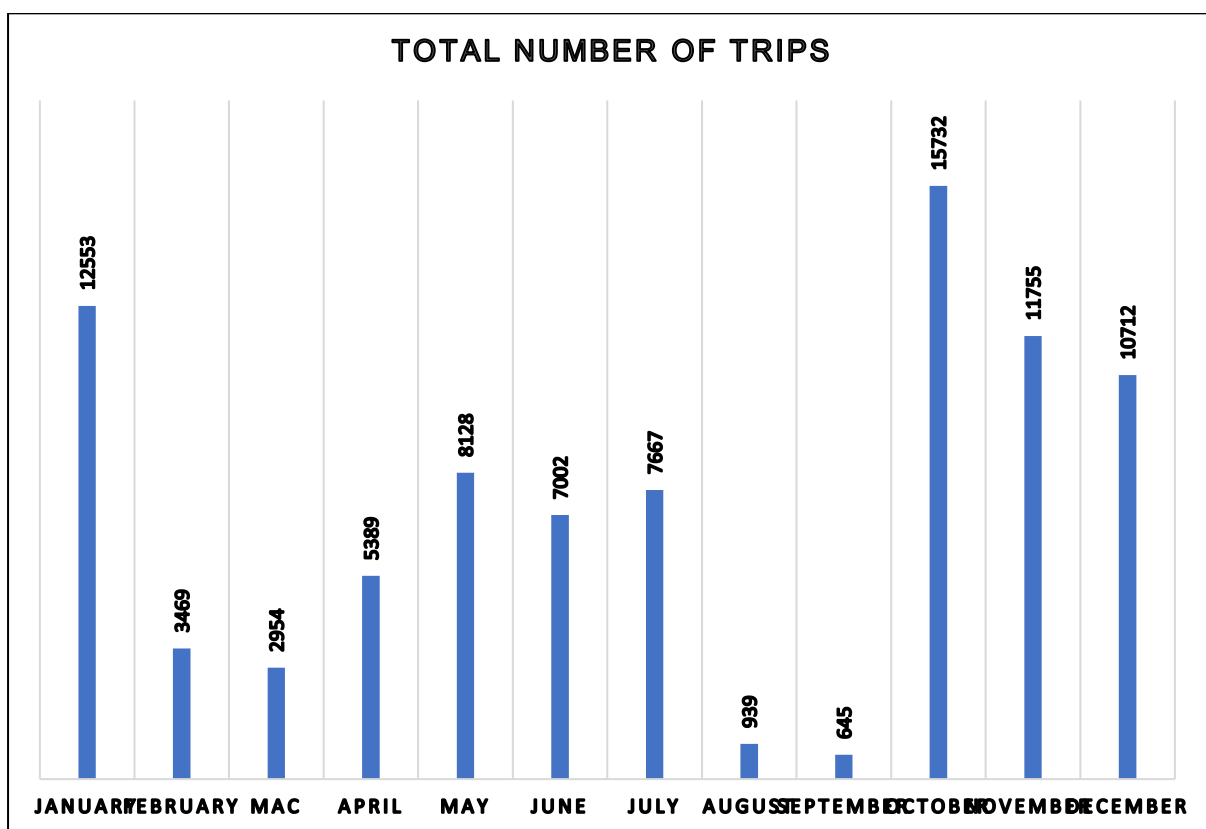


Figure 1: The Total Number of Trips
 Source: UiTM Perak Dashboard, 2023

Based on Figure 1, the usage pattern exhibits fluctuations, with peaks and troughs evident in the data, primarily influenced by the major users, namely the students. The frequency of usage is contingent on two key factors: the academic semester and the rate of e-scooter utilization. UiTM operates on a two-semester system, spanning from September to

February and March to July 2024, with breaks occurring in February to March and August to September. This pattern significantly impacts e-scooter usage on campus, as illustrated in Figure 1. The highest utilization occurs during active semesters when all students are present on campus. Specifically, January and October recorded the highest total usage with 12,553 and 15,732 trips, respectively, while the lowest usage is observed in August and September 2023.

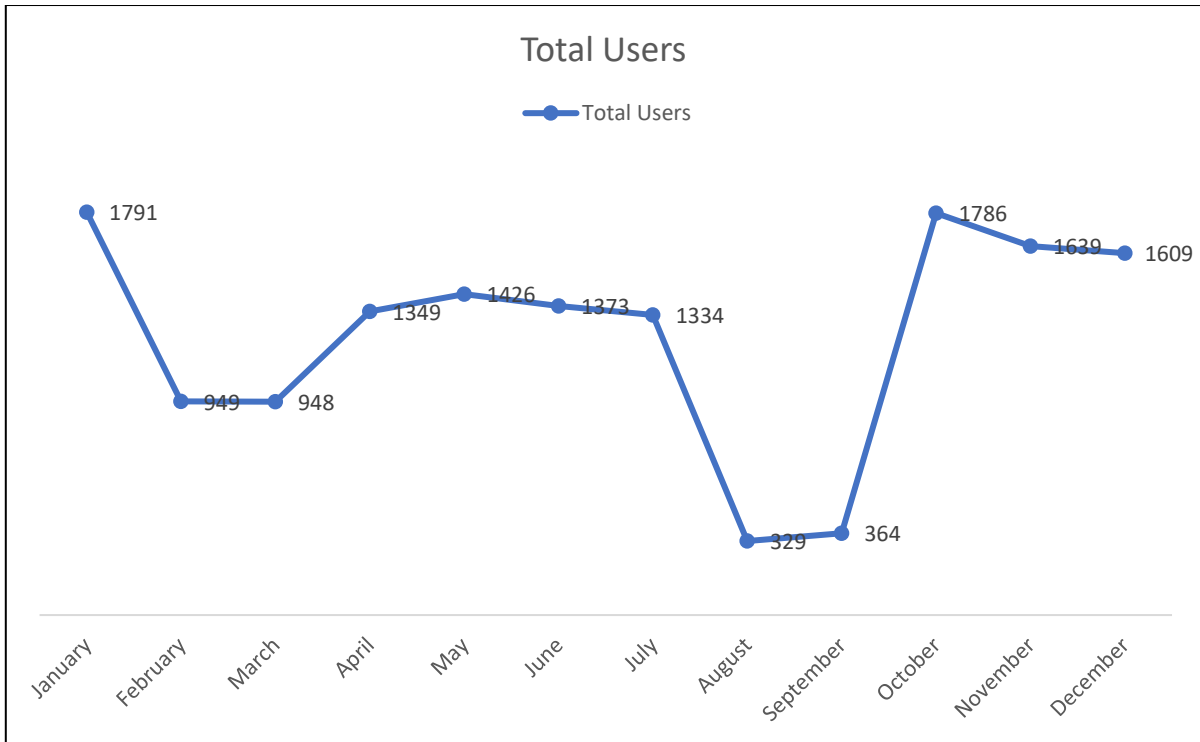


Figure 2: The Total Number of Users
Source: UiTM Perak Dashboard, 2023

As the primary demographic for e-scooter users on campus is the students, the subsequent analysis concentrates on the overall number of students utilizing e-scooters from January to December 2023. This trend aligns (Figure 2) with the total usage data discussed in Figure 1. The peak number of users is observed in January, reaching 1,791 users, and a comparable high in August 2023 with 1,786 users. Conversely, the lowest number of users is recorded in August and September, corresponding to the semester break, where the potential users are primarily university staff, totaling only 329 and 364 users.

CONCLUSION

This e-scooter program is in line with the previously signed MOU between university with BEAM. It also brings numerous benefits in achieving UiTM Perak's goal as a Green Campus and implementing 'Low Carbon Initiatives' including achieving a Green Campus and low-carbon environment within the campus and surrounding areas through the reduction of motorized vehicle usage. Besides that, affordable rental rates for Dockless Bicycles and E-scooters tailored to students' preferences around RM 0.30 cents to RM 0.50 cents per minutes. Furthermore, collaborative networks in various aspects of expertise sharing can enhance the teaching staff's knowledge, focusing on green sustainability among strategic partners. Lastly, adopting a healthy lifestyle through cycling and e-scooter use simultaneously reduces carbon emissions and minimizes the use of motorized vehicles within the campus.



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WEBINAR – BACK TO BASICS: BIM FOR QS

| | |
|-------------------|--|
| Speakers | : 1. Sr Dr. Norsyakilah Romeli Senior Lecturer, Faculty of Civil Engineering & Technology, UniMAP 2. Ms. Siti Noratikah Mohammad Customer Success Consultant, Glodon Software Sdn Bhd |
| Moderator | : Sr Sharifah Noraini Noreen Syed Ibrahim Al Jamalullail Treasurer, QS Division Session 2023/2024 |
| Date | : 15 January 2024 |
| Time | : 9.00 AM – 11.00 AM |
| Attendance | : 210 participants |
| CPD points | : 1 point (BQSM) |

A. OVERVIEW

What is BIM? How will it benefit QS?

This webinar emphasises the transformative role of quantity surveyor in 5D building information modelling (BIM) by revolutionising the cost management aspect. Fundamental BIM knowledge is essential for effectiveness in utilising BIM to its full potential, especially in understanding its core principles and workflows.

Through the integration of cost into spatial and temporal dimensions, 5D BIM enhances collaboration, enables accurate cost estimation and empower decision-making, which optimises overall construction efficiency.

B. THE EVENT

- The registration commenced at 8.45 a.m.
- The Moderator of the session, Sr Sharifah Noraini Noreen Syed Ibrahim Al Jamalullail, commenced the webinar at 9.00 a.m. by welcoming the participants and introducing the esteemed speakers.
- At 9.10 a.m., the first Presenter, Sr Dr. Norsyakilah Romeli started her presentation and delved into the topic of BIM Landscape: Growth in the Malaysia Construction Industry.
- At 9.45 a.m, the second Presenter, Ms. Siti Noratikah Mohammad continued the session by sharing her perspective on BIM Fundamentals and dived into the Revolutionising Construction Practices with 5D BIM and 5D BIM Walk-Through Process and E-Tender BIM
- The session ended at 11.00 a.m.

C. NOTES OF APPRECIATION

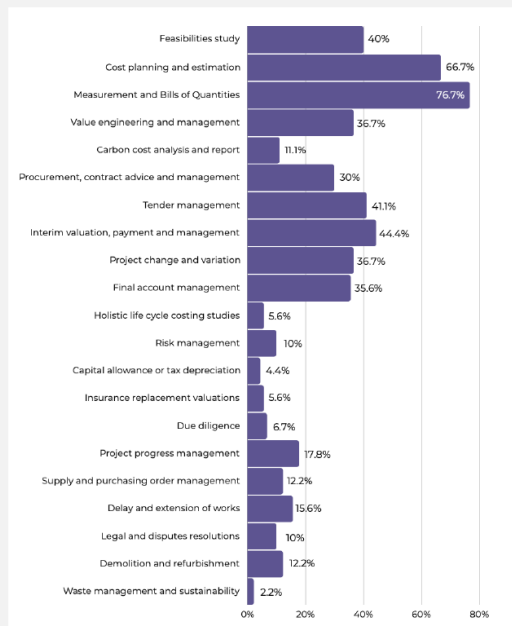
RISM QS Academy would like to extend its appreciation to Glodon Software Sdn Bhd for co-organizing the webinar.



QUANTITY SURVEYOR
PRACTICE PHASE DRIVEN BY
DIGITALIZATION ADOPTION

*Gap in between pre & post contract practice (30-40%)

- Higher for pre contract
- Trends to inclined for post contract
- Project progress management a bit low, although BIM features is promising for project progress
- life cycle costing also low

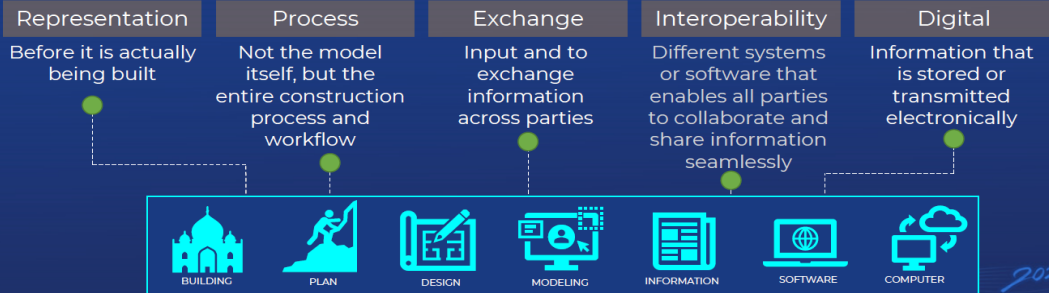


G What is BIM?

Glodon

BIM BUILDING INFORMATION MODELLING

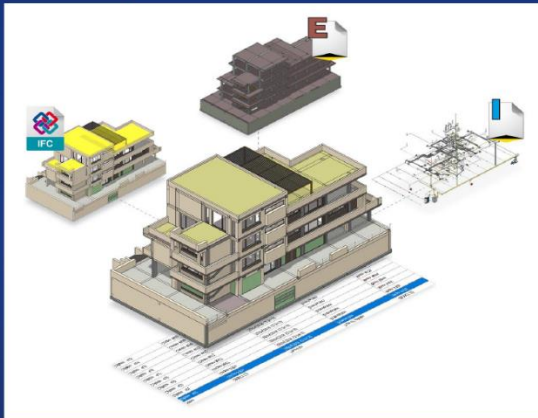
“BIM is a digital representation of the building process to facilitate exchange and interoperability of information in digital format”



2023
Digital Building Platform Service Provider

G Elements of BIM

Glodon

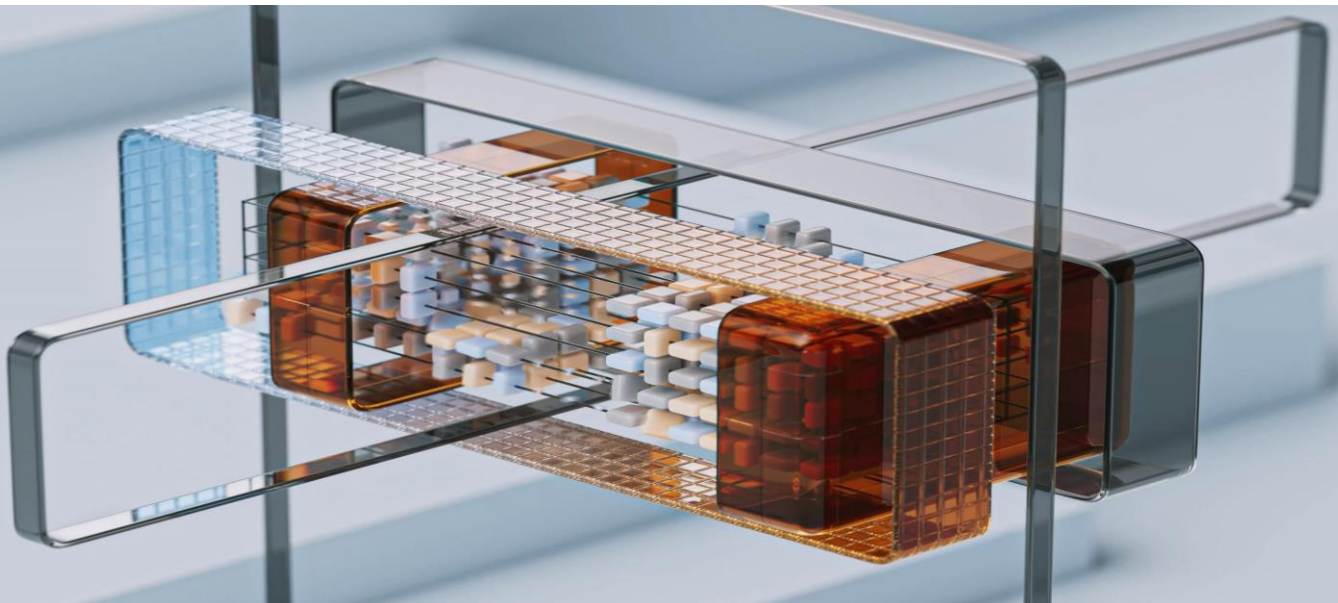


NOT
BIM is ~~a~~ software!



BIM encompasses 3 key aspects: **people, process** and **technology**

2023
Digital Building Platform Service Provider

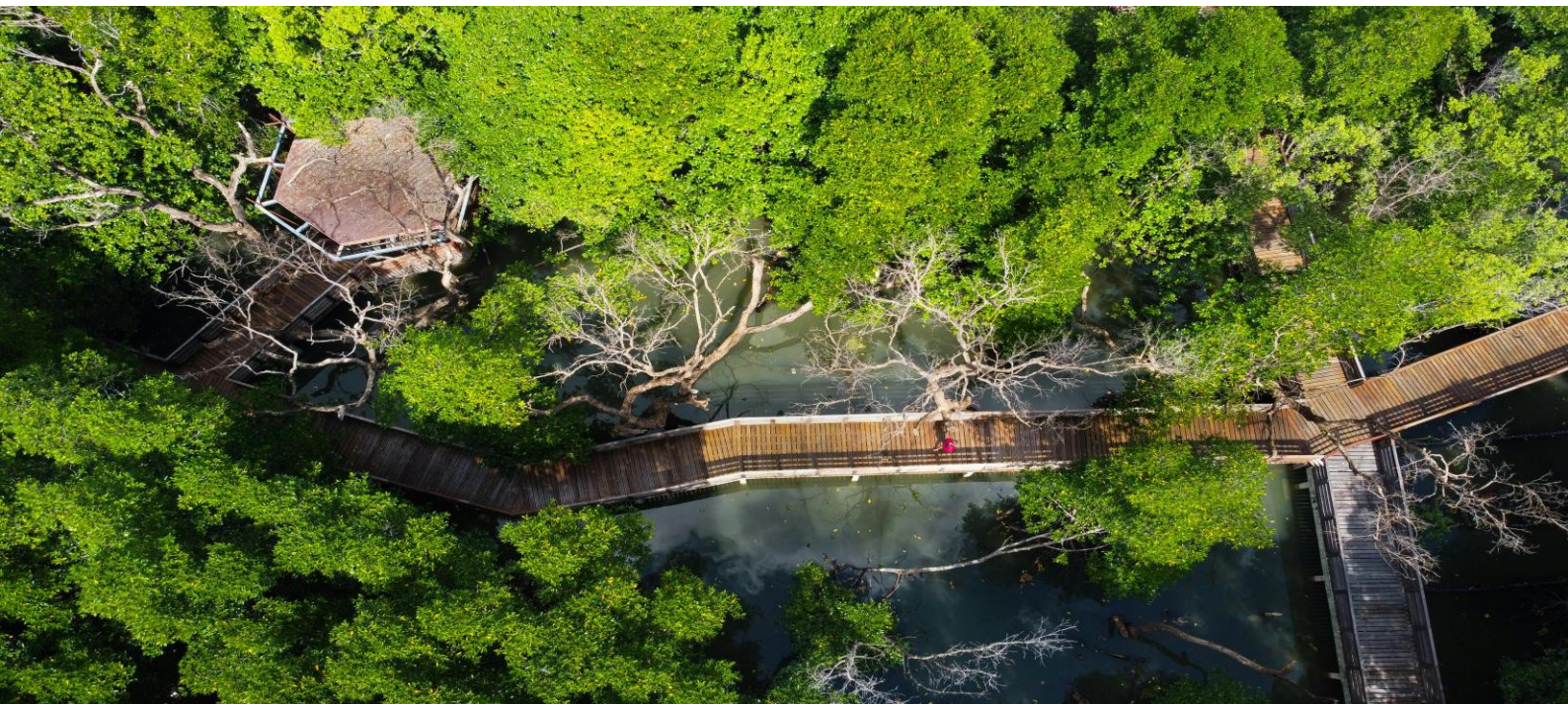


PUBLICITY – MONTHLY ACTIVITIES

SITE VISIT TO IIUM RIVERS AND CAMPUS

On Friday, 12th January 2024, a site visit and meeting were held with Dr. Syakirin, Head of the QS Department at IIUM, to explore two rivers located within the IIUM campus. The visit aimed to assess the condition of these water bodies and discuss potential initiatives for their conservation and improvement.

During the meeting, several key points were addressed in collaboration with the QS Department of IIUM. Firstly, it was agreed that a River Awareness Talk would be organized by the Centre for Sustainability IIUM, targeting members of the QS Division and students of the HLI in Kuala Lumpur. This talk aims to educate and raise awareness about the importance of preserving rivers and the role individuals can play in their conservation. Additionally, plans were discussed for a river cleaning program and tree planting along the banks of the IIUM rivers. These activities aim not only to enhance the aesthetic appeal of the riverbanks but also to contribute to the overall health and sustainability of the ecosystem. Through collaborative efforts between various stakeholders, including academic institutions and environmental organizations, it is hoped that these initiatives will foster a greater sense of responsibility towards the preservation of natural resources within the IIUM community and beyond.



QS ACADEMY

Below are the activities organized by QS Academy Committee

1. Technical Visit

| S/N | Description | Details | Date | Status |
|-----|--|---|--------------------------------|-----------------------------|
| 1 | LRT3 Project | Venue: OCC Depot Johan Setia, Klang | 17 th October 2023 | Completed (28 participants) |
| 2 | TNB Platinum Building Kompleks Balai Islam An-Nur/ Masjid TNB Bangsar | New TNB HQ, attained GBI platinum rating Green technology mosque | 2 nd November 2023 | Completed (37 participants) |
| 3 | Visit to Feruni Showroom | Feruni Showroom, Petaling Jaya | 13 th December 2023 | Completed (29 participants) |
| 4 | Visit to Topcon | Topcon, Shah Alam | 20 th December 2023 | Completed (30 participants) |

2. Seminar/ Webinar

| S/N | Description | Speaker | Date | Status |
|-----|---|---|---|---|
| 1 | Webinar: ICMS – Global Consistency in Managing & Benchmarking Construction Cost | Sr Dr Ong See Lian | 19 th September 2023 | Completed (total 248 pax of participants) |
| 2 | Webinar: Back to Basics – BIM for QS | RISM IC – Sr Dr. Norsyakilah Romeli Glodon – Ms. Siti Noratikah Mohamad Moderator – Sr Sharifah Noraini Noreen | 15 th January 2024 | Completed (total 205 pax of participants) |
| 3 | Seminar: Einstein's Contribution to Modernising Construction Contracts in Malaysia <i>- Now everyone can fly Understand construction contracts</i> | Associate Professor Sr Dr Naseem Ameer Ali | 24 th January 2024 | Completed (total 300 pax of participants) |
| 4 | Half-Day Seminar CIS27:2019 <i>- to be co-organized with CIDB</i> | CIDB, JKR, JPS and LLM | 20 th / 21 st February 2024 | To be carried out |

BENEFITS OF GREEN PROCUREMENT: PERSPECTIVES FROM THE MALAYSIAN CONSTRUCTION INDUSTRY

INTRODUCTION

The construction industry acts as one of the major stimulants towards the economic growth and development of a country. Despite the construction industry playing a crucial role in contributing to the prosperity of the economy, it is also a double-edged sword that brought a negative impact on the environment. The activities carried out from the construction to the disposal phase will generate dust, noise, traffic congestion, and environmental pollution (Zuo and Zhao 2014). Due to a larger industrial production, the combustion processes emission and fossil CO₂ emissions from by-product of manufacturing construction materials such as cement, steel and chemicals have increased by 56% and 141% at the global level between 1990 and 2018, the increase was largely driven by developing countries like China (337%), India (249%), other South East Asian countries (287%) and Brazil (89%) (Oreggioni et al. 2021). During the life cycle of construction projects, the energy released will emit carbon dioxide (CO₂), which is a major component of greenhouse gas (GHG). The increment of CO₂ emission from the construction sector will increase the average temperature of the earth, which leads to global warming. Hence, it is essential to develop a safeguarding policy that can mitigate the intemperate harm to the environment during the project life cycle and aid the country to achieve a sustainable development accordingly.

The sustainable development advocates the concepts of energy and resource saving, encourages the usage of recyclable and toxic-free materials, as well as upholds the notion of improving the indoor quality of human life without compromising the quality of the ecosystem throughout its life cycle (Alqadami et al. 2020). To alleviate the deterioration of the environment and to pursue the sustainable development goals, the construction industry must take concerted efforts to execute green practices in construction projects. Green construction refers to the incorporation of environmental values into the whole construction process, from design to disposal phase, to protect the environment and achieve sustainable development (Saferi et al. 2018). A green procurement that reduces the environmental impacts is one of the avenues to achieve green construction. This is in contrast to the traditional procurement, such as the lowest bid method, which has little considerations on construction environmental issues that could result in environmental degradation that impairs quality of life and incurs huge indirect damage costs for project owners (Wirahadikusumah et al. 2021).

The green procurement is the acquisition of products and services which have lesser environmental impacts than others that perform the same function, or products that fulfil preset environmental standard (Simion et al. 2019). The concept of green procurement also includes integrating environmental considerations into the procuring strategies, policies, and actions (Khan et al. 2018). In Hong Kong, Wong et al. (2016)

observed that the government had started to implement a green procurement policy to achieve a low-carbon living. Besides, both public and private bodies had already begun to practice green procurement in the Swedish construction sector (Varnäs et al. 2009). In China, the government had launched the Chinese Governmental Green Procurement (GGP) that defines the green procurement implementation and had since gradually formulating a green procurement-related legal system (Liu J et al. 2019). In Nigeria, two separate studies on barriers to green buildings implementation in public hospitals (Ebekozen, Ayo-Odifiri, et al. 2022) and barriers to green certification of buildings (Ebekozen, Ikuabe, et al. 2022) proposed suggestions to policymakers to promote green procurement that are relevant to developing countries. Meanwhile, in the Malaysian construction industry, a green procurement policy has been established by the government under the National Green Technology Policy 2019 (Alqadami et al. 2020). Despite the policy being rather new in Malaysia, it is an indication of a boost in sustainable construction practice. Implementing the green procurement does not only effectively mitigate some of the most pressing environmental issues, but also enhance a country's pro-environmental reputation.

To support the sustainable development goals (SDGs) and to survive in the green construction era, non-adopters will likely adopt the green procurement when the benefits are known. Lindenberg and Steg (2007) highlighted that people appear to engage in high-cost pro-environmental behavior when benefits outweigh costs associated with the behavior. The study on green procurement in construction sectors, a high-cost pro-environmental behavior since procurement cost of materials is about half of the total operating costs (Al-Atesh et al. 2023), is currently limited in Malaysia (Alqadami et al. 2020). To our knowledge, existing literature focused on the driving factors (Wong et al. 2016; Darko et al. 2017) and barriers (Ogunsanya et al. 2022) of green procurement in construction industry and little is known on the benefits of implementing green procurement.

Bohari et al. (2017) in their preliminary study on the green oriented procurement for buildings in Malaysia, revealed that the adoption of green procurement is fragmented and suggested for a concentrated strategy to raise the benefits of green procurement among key stakeholders. Bohari et al. (2020) further studied the key stakeholder values that encourage green procurement found that stakeholder commitment, technical competencies, awareness and knowledge sharing have positive influence to shaping green procurement in the construction industry. This study is also motivated by the low level of awareness on green procurement practices (Adham and Siwar 2012; Bohari et al. 2017) and its benefits (Bidin Z et al. 2019) among the Malaysian construction players. Hence, this study aims to appraise the potential benefits delivered by the green procurement approach towards the environmental, economic, and societal aspects. The industry needs to be cognizant of how green procurement supports sustainable

development goals (SDGs) to reap the benefits of adopting green procurement strategies.

GREEN PROCUREMENT IN THE CONSTRUCTION INDUSTRY

The construction industry is one of the major contributors to the rising environmental problems. Hence, there is an urgent call to promote green concepts in the construction industry to reduce the environmental impacts as well as to advance sustainable development. In the same vein, the construction procurement is the most appropriate medium to regulate environmental issues in a construction development process (Zhu et al. 2013).

As described by Bidin ZA et al. (2018), “green” indicates the concept to amalgam, accept and execute environmental practices or initiatives designed to mitigate environmental degradation during the life cycle of projects. In construction projects, a procurement practice integrated with green practice is also known as the green procurement. Bohari et al. (2017, p.692) stated that a green procurement, also termed as a sustainable procurement, is defined as “*the act of obtaining or disposal and recognition of goods, services, engineering and construction works. It also encompasses the integration and implementation of environmentally friendly practices throughout the processes involved in producing a construction output such as a building or infrastructure*”. Hence, green materials, products, services, and policies are utilized in the green procurement to reduce the negative impacts on the environment. Additionally, the green procurement resulted in lesser consumption of energy and waste as well as reduction of carbon footprints and harm to the environment in projects (Wong et al. 2016).

In a green procurement policy, the environmental terms should be spelt out during the initial planning stage and the assessment of a tender (Saferi et al. 2018). The present-day consumers were moving towards an eco-consciousness trend, thus, construction companies are advocating to differentiate themselves from others by utilizing green materials in the development process (Simion et al. 2019). For instance, the acquisition of recyclable materials, collaboration with green suppliers, and green waste management are among the considerations of construction players when developing their projects. The adoption of green procurement aids in strengthening human welfare and environmental concerns whilst attaining sustainability at the least possible expense with finest quality (Ezani et al. 2018).

Green Materials

According to Saeli et al. (2020), the consumption of non-renewable materials in the construction industry has generated a vast amount of GHG and wastes which consequently contribute to high levels of unsustainability. Careful environmental considerations when procuring building materials and construction services are able to minimise the carbon and energy emitted during the construction process. Kuitinen

(2015) mentioned that building with green construction materials contributes to sustainable development that alleviates impacts on the environment.

The procurement of green materials can be initiated at the early design and planning phase of the construction projects as this phase possesses a considerably high opportunity to influence the life cycle impacts of the buildings. The green building materials refer to materials that possess lower emissions, usually contain non-toxic or recyclable components, and have recyclable ability (James and Yang 2005). Hence, the procurement of green materials can contribute to the reduction of pollutants and carbon footprint effectively.

In India, researchers recommended recycling and utilising waste materials such as marble waste to replace cement or the proportion of cement as these practices can reduce carbon dioxide emissions (Thakur et al. 2018). Furthermore, eco-friendly tiles, sand lime bricks, and reflection glass are some instances of green materials that have lower energy consumptions. Before choosing green materials, the procurers can evaluate the green impacts of the products through their eco-labellings (Bratt et al. 2011). Mokhlesian (2014) emphasised the importance to transform “disposable materials” to “recyclable materials” in the effort of going for the green construction. Since green construction materials can generate immediate results to reduce environmental impacts, a wider usage in the construction industry will expedite the progress towards sustainable construction.

Green Suppliers

In traditional construction projects, the suppliers are usually selected based on their economic and technical efficiencies, often times disregarding their ecological efficiency. The selection of green suppliers has gained growing interests among the construction practitioners; similar to the rate of environmental damage (Konys 2019). Through the green procurement approach, the green suppliers will supply eco-materials and or produce green products designed for the construction companies (Blome et al. 2014; Woo et al. 2016). The selection of suppliers plays a pivotal role in the attempt to realise the green procurement. Hence, several selection criteria, must be taken into account by the companies, such as cost, quality, pollution control, green product, environmental management, reputation, and green design capability (Bag 2017) to ensure the selected suppliers possessed excellent environmental performance. To pursue the objectives of the green procurement, some construction companies also came out with environment-oriented plans and listed toxic substances which are harmful to the environment for the suppliers to avert the contamination of such substances in the raw materials, packaging, and or waste generated (Tsai et al. 2016).

BENEFITS OF GREEN PROCUREMENT APPLICATION

Prior to advocating for the green procurement in the construction industry, it is important to identify the benefits that can be generated through its application. A good understanding of the advantages derived from the green procurement can help to enhance the readiness and awareness of the public on the importance of prompt implementation of the green procurement in the construction industry. Thus, this study explored the positive impacts of green procurement adoption on the environment, economy and society. The eleven identified benefits, consolidated from literature on green procurement and green buildings, are discussed concisely below.

I. Environment

Reduce greenhouse gases emission

There is a tremendous potential to reduce the emission of GHG through construction sectors in comparison with the other main emitting sectors. In this light, the green procurement is one of the initiatives that can be implemented to mitigate GHG emissions (Bohari et al. 2017; Ofek et al. 2018). The transformation of conventional procurement to green procurement in the construction industry will subsequently replace unsustainable construction materials with sustainable and low-carbon construction materials (Xu et al. 2020). For instance, utilising green cements will lessen carbon emissions, leading to reduction of GHG in the atmosphere, as the materials are fabricated majorly from discarded industrial waste.

Furthermore, incineration and landfilling have conventionally been the methods for contractors to dispose of construction waste (Lu et al. 2019). However, a vast amount of GHG will be released from incinerating plastics and insulation materials (Ortiz de Montellano 2010; Kuusela et al. 2021). Hence, the adoption of green procurement can help to alleviate these issues as it promotes the utilisation of low-carbon and recyclable construction materials. The green procurement also integrates environmental considerations into the disposal process of construction wastes, thus reducing the GHG emission accordingly.

Reduce pollution levels

The green procurement is one of the pollution abatement measures to the construction industry that is known to be responsible for producing air, noise, water, and soil pollutants. Stakeholders informed with the green procurement knowledge will control the composition of chemicals and hazardous substances incorporated into building materials (Khan et al. 2018), which will reduce toxic gases released into the atmosphere. The green procurement can reduce GHG and environmental impact throughout their life cycle and is one of the many actions to mitigate global warming (Vejaratnam et al. 2020).

Construction dust generated from transportation and demolition activities can be mitigated (Wu et al. 2016) when green practices are integrated into the transportation

and demolition phases via the green procurement approach. The construction and demolition waste generated in the construction process can be used for the production of new raw building materials rather than being incinerated or landfilled (Bonoli et al. 2021). The ashes and flue gases released from the incineration process can be largely reduced to improve the air quality.

Conserve natural resources

The depletion of scarce natural resources has escalated along with the expansion of the construction industry. This calls for an immediate action to implement the green procurement in the construction sector as it serves as a good medium to conserve limited resources. According to Wong et al. (2016), green procurement promotes the usage of eco-labelled products. Bratt et al. (2011, p.1632) defined an eco-label as “*a label which identifies overall environmental preference of a product or service within a specific product/service category based on life cycle considerations*”. The utilization of materials with ISO Type 1, also known as eco-label, in the development process of the building enables the effective conservation of resources. The green procurement also advocates the concept of reuse and recycle, such actions will decelerate the pace of natural resource depletion. Furthermore, the green procurement promotes the usage of green materials which are generally made from renewable biological resources and manufactured using a lower amount of energy resources (Bohari et al. 2017).

Reduce energy consumption

The energy emitted by the construction industry accounted for 20% of global energy consumption (Liu J et al. 2020) and CO₂ is also one of the compositions from the energy released. The energy produced throughout the whole life cycle of a building is called an embodied energy. According to Hu and Milner (2020), the embodied energy includes the energy used to extract raw materials, manufacture and transport construction materials, and produce, construct, maintain, and repair the building during the operation stage as well as demolish the buildings. When the energy emission increases, the carbon concentration in the atmosphere will thereby increase, resulting in global warming. To minimise the amount of embodied energy, the green procurement is a good instrument to attain the goal of constructing a low-carbon building. The main emphasis of the low-carbon buildings is low energy consumption and carbon emissions (Luo and Chen 2020). The green procurement promotes the utilization of sustainable energy-efficient construction materials in the construction of the buildings. By constructing low-carbon buildings, the energy emitted would consequently be reduced. The utilization of green technologies is also one of the concepts under green procurement frameworks. Integrating green technologies such as green wall technology and prefabricated concrete technology in the design and construction phase of the buildings, produces

sustainable end products (Darko et al. 2017). These green technologies are energy efficient as they consume lesser energy compared to conventional technologies.

II. Economic

Achieve long-term cost savings

The implementation of green procurement provides the benefits of reducing both operational and environmental costs but procuring green materials and technologies often incur higher costs than the conventional procurement approach. Shen et al. (2017) reported that constructing with green building materials leads to an increment of 8.5-13.9% of the overall investment of the projects as compared to traditional building materials. Besides having to spend more in green construction methods and technologies, staff training adds to the investment cost. Nevertheless, it is noteworthy that the adoption of green procurement will lead to long-term cost savings. This is because such practice will not only improve environmental performance, but also significantly reduce environmental handling cost (Wong et al. 2016). Utilising energy-efficient designs and recyclable products via the green procurement policy, the energy and resource consumption, utility bills and disposal costs are reduced accordingly. The savings achieved during the operation and maintenance phases can counteract the expensive upfront cost spent to purchase green building features (Olmsted 2019).

Gain competitive advantage in construction market

The integration of environmental criteria into the construction procurement process may help a company to differentiate itself from its competitors (Shen et al. 2017). Thus, implementation of a green procurement policy can help the company to gain competitive advantages in the local construction market. Moravcikova et al. (2017) opined that it is vital to evaluate the client's requirements and demands to sustain in a competitive business environment. Wong et al. (2016) asserted that the rising environmental awareness of the public has triggered the demand for green products. Construction firms should leverage on green procurement as an environmental capability to enhance their competitiveness and sustainability in the market (Liu J et al. 2020).

Establish new entrance for businesses in environmental field

With the rising demand for sustainable products and services triggered by green procurement, new business opportunities in the environmental field have emerged. Olantuji et al. (2019) found many manufacturers added carbon footprint reduction to their performance indices as there is a growing level of alertness to environmental protection vis-a-vis emission control and climate change. The focus of switching to green manufacturing and carbon-efficient supply chain, as a result of competitive advantage, is intended to improve their production and product consumption. Many new entrants for environmental businesses positioned themselves as green suppliers or manufacturers

that supply and produce green materials to the construction markets. This is in line with Chekima et al. (2016) who affirmed that environmental degradation had established new entrance for businesses to invest in new categories of green products that make considerable profits.

Create job opportunities

The adoption of green procurement will stimulate the development of green technologies and green manufacturing, thus creating job opportunities in both sectors. Grandia and Voncken (2019) asserted the application of green procurement in the construction sector will trigger the fabrication and utilization of eco-friendly products and hence mitigate the unemployment rate in labour market. A study in Malaysia found that more job opportunities were created as more businesses involved in sustainable green business (Fernando et al. 2019). The society will not only reap the benefits of a green environment promoted by the green procurement policy and awareness, but also trigger employment when firms renew, reuse and properly dispose of end-of-life products.

III. Social

Enhance reputation of clients' companies

Green procurement serves as a critical tool to enhance the image and reputation of a construction firm. Construction enterprises established good company images when their project developments comply with the green procurement requirements (Chinomona and Omoruyi 2018). A firm's reputation in the environmental dimension has gained growing attention in the past few years, hence incorporating green procurement into the construction process can enhance both the firm's economic position and reputation (Quintana-García et al. 2021). Wong et al. (2016) further affirmed that the application of green procurement can promote a firm's positive public reputation on corporate social responsibility (CSR) as well as cultivate the consciousness of the staff on the environmental practices and policies.

Provide healthier working environment

A healthier workspace can be created through the enforcement of green procurement during the construction process, this is because the concentration of dust and toxic substances have been reduced with the usage of green materials. The green construction materials that are responsibly sourced and environmentally safe can reduce the consumption of natural resources and material, the use of toxic chemicals, and the pollutants and wastes over the material life cycle (Omer and Noguchi 2020). It is also found that the application of green practices and techniques can reduce the adverse impact on the worker's health and minimise absenteeism (Ruparathna and Hewage

2015). There will be greater productivity among workers when provided with healthier working environment.

Improve community health and quality of life

Green procurement mitigates the use of toxic and hazardous materials (Ruparathna and Hewage 2015), enhances the quality of air and water quality, and minimises waste disposal (Shurrab et al. 2019). With the green procurement approach, the construction waste can be reused and recycled into new construction materials instead of being disposed of by incineration, thereby reducing the air pollution level in the atmosphere. Ofek et al. (2018) claimed that buildings constructed of green building components such as green roofs can cool down up to 2.3°C of average indoor temperature and guarantee indoor quality. It is undeniable that green procurement decisions will benefit the public by protecting their health and improving their quality of life.

Research findings and discussion

A total of 380 questionnaires were distributed via LinkedIn and social media in which 150 valid responses were returned, attaining a response rate of 39.5%. An online questionnaire survey was conducted in February to May 2022. A preliminary set of benefits of green procurement applications collected from the literature review was presented in the pretest questionnaires. A pilot study was conducted to validate the questionnaire with top management and senior managerial personnel with high involvement in green procurement from seven developers, ten consultants, seven contractors and six suppliers through face-to-face interviews. They were asked to comment on benefits of green procurement applications in the pretest questionnaire and to exclude the benefits that were deemed unimportant.

Research findings and discussion

The benefits of adopting green procurement in the construction industry were ranked following the mean scores. Overall, the five most critical benefits generated by green procurement practices are:

- 1) Reduce pollution levels (Mean = 4.173)
- 2) Improve community health and quality of life (Mean= 4.113)
- 3) Conserve natural resources (Mean = 4.080)
- 4) Reduce greenhouse gases (Mean = 4.053)
- 5) Provide healthier working environment (Mean = 4.053)

“Reduce pollution levels” is being ranked as the most important benefit brought by green procurement adoption. As aforementioned, the green procurement refers to the action of acquiring products, works and services in a more environmentally friendly manner (Bidin Z et al. 2019). Yang et al. (2019) asserted that the wastes generated from the production process could be minimized by procuring biodegradable building

materials. Thus, environmental pollution could be mitigated accordingly. This is further supported by Shurrab et al. (2019), who stated that the integration of green practices into the construction process could effectively curtail the use of toxic substances and the production of effluent and solid waste, and subsequently improve the air and water quality.

The second-ranked significant benefit is “improve community health and quality of life”. The result is akin to the past study of Chan et al. (2018) who revealed that through the green procurement practices, the usage of noxious substances and production of waste could be mitigated effectively and the negative impacts on human health could be brought down eventually. This is because the green procurement concept supports recycling of building materials rather than incinerating or landfilling (Ortiz de Montellano 2010). Consequently, the emission of GHG or hazardous substances during the landfilling and incinerating process could be reduced, thus improving the health of the community. The decrease in solid wastes that need to be disposed of would indirectly control the environmental pollution issues such as water, air and soil pollution. Consequently, the quality of life could be enhanced accordingly when living in a safer, cleaner and more comfortable environment.

Next, “conserve natural resources” is ranked third among the 11 benefits identified. The upsurge in the depletion rate of natural resources had become the main concern of society (Ali et al. 2016). The implementation of green procurement serves as a crucial instrument in conserving scarce resources since one of its concepts is to utilize reusable and recyclable materials to construct a building. The raw materials used to manufacture sustainable construction materials are generally extracted from wastes such as agricultural waste, industrial slag and construction waste. This suggests that the production of green materials rarely consumes natural resources unlike the production of traditional construction materials (Xu et al. 2020). The green procurement practice is undeniably a decisive factor in alleviating the issues of natural resource depletion.

“Reduce greenhouse gases emission” is the fourth significant benefit that can be gained through the adoption of green procurement. GHG were regarded as the major contributor to climate change. Agyepong and Nhamo (2017) identified green procurement as one of the measures that could be employed to alleviate the issues of climate change. As aforesaid, one of the concepts of green procurement is to purchase and utilise green materials in the construction process. The use of green building materials do not emit significant amount of pollutants to the environment as they are generally made up of non-toxic substances and recycled products, they (James and Yang 2005). According to Wilson and Tagaza (2006), the employment of reused, recycled, and low-emitting materials was proven to be effective in attenuating GHG emission.

The fifth-ranked benefit is “provide healthier working environment”. It is noteworthy that by practising green procurement in a construction project, workers are provided with a more ambient and healthier working site due to low emission of toxic

chemicals (Khan et al. 2018). Jayawardana et al. (2023) echoed that the emission of toxic substances or gases would be mitigated with green procurement that highly promotes the usage of green building materials on site. A healthier occupational space with reduced illnesses such as asthma, headaches and allergies among the workers will improve the productivity of workers.

Differences in perceptions between parties

The Kruskal-Wallis test results showed that there is a significant difference among the perceptions of the four respondent groups in regard to five benefits, which are “conserve natural resources”, “reduce GHG emission”, “reduce energy consumption”, “long term cost savings” and “provide healthier working environment”.

It was observed that there is a heterogeneous view among the respondent groups in perceiving the environmental benefits engendered by green procurement execution such as “conserving natural resources”, “reduce GHG emission” and “reduce energy consumption”. This might owe to the fact that most of the construction practitioners had dissimilar levels of awareness concerning environmental issues. Environmental awareness is regarded as one of the major drivers in pursuing green procurement. Despite that, the environmental awareness among the construction practitioners may be weak due to the absence of informative programs such as training courses, conferences, workshops or seminars provided by the government to the construction practitioners to enhance their knowledge and awareness level on environmental agendas. Besides, an empirical study conducted by Bohari et al. (2020) revealed

Table 1. Mean ranking of benefits of green procurement applications

| Benefits of green procurement applications | Overall (N=150) | | | Developer (N=32) | | | Consultant (N=44) | | | Contractor (N=44) | | | Supplier (N = 30) | | | Chi-square | Asymp. sig |
|--|-----------------|-------|----|------------------|-------|----|-------------------|-------|----|-------------------|-------|----|-------------------|-------|----|------------|------------|
| | Mean | SD | R | Mean | SD | R | Mean | SD | R | Mean | SD | R | Mean | SD | R | | |
| Environment | | | | | | | | | | | | | | | | | |
| Reduce pollution levels | 4.173 | 0.849 | 1 | 4.156 | 0.987 | 3 | 4.159 | 0.745 | 4 | 4.068 | 1.021 | 1 | 4.367 | 0.490 | 3 | 1.166 | 0.761 |
| Conserve natural resources | 4.080 | 0.737 | 3 | 4.094 | 0.777 | 6 | 4.205 | 0.509 | 1 | 3.727 | 0.899 | 5 | 4.400 | 0.498 | 1 | 15.100 | 0.002** |
| Reduce greenhouse gases | 4.053 | 0.767 | 4 | 4.125 | 0.833 | 5 | 4.023 | 0.762 | 8 | 3.818 | 0.815 | 3 | 4.367 | 0.490 | 3 | 11.786 | 0.008** |
| Reduce energy consumption | 3.980 | 0.863 | 7 | 3.875 | 1.070 | 8 | 4.205 | 0.632 | 2 | 3.636 | 0.942 | 8 | 4.267 | 0.583 | 6 | 12.439 | 0.006** |
| Economic | | | | | | | | | | | | | | | | | |
| Establish new entrance for businesses in environmental field | 3.967 | 0.847 | 8 | 4.000 | 0.950 | 7 | 4.068 | 0.728 | 7 | 3.705 | 0.930 | 6 | 4.167 | 0.699 | 8 | 6.131 | 0.105 |
| Achieve long term cost saving | 3.953 | 0.951 | 9 | 3.813 | 1.091 | 9 | 4.114 | 0.722 | 5 | 3.591 | 1.085 | 9 | 4.400 | 0.621 | 2 | 13.724 | 0.004** |
| Gain competitive advantages in construction market | 3.813 | 0.972 | 10 | 3.781 | 0.870 | 10 | 3.886 | 0.868 | 10 | 3.545 | 1.210 | 11 | 4.133 | 0.730 | 9 | 4.828 | 0.185 |
| Create job opportunities | 3.747 | 0.884 | 11 | 3.719 | 1.054 | 11 | 3.818 | 0.786 | 11 | 3.568 | 0.974 | 10 | 3.933 | 0.640 | 11 | 2.218 | 0.546 |



| Benefits of green procurement applications | Overall (N=150) | | | Developer (N=32) | | | Consultant (N=44) | | | Contractor (N=44) | | | Supplier (N = 30) | | | Chi-square | Asymp. sig |
|--|-----------------|-------|---|------------------|-------|---|-------------------|-------|---|-------------------|-------|---|-------------------|-------|----|------------|------------|
| | Mean | SD | R | Mean | SD | R | Mean | SD | R | Mean | SD | R | Mean | SD | R | | |
| Social | | | | | | | | | | | | | | | | | |
| Improve community health and quality of life | 4.113 | 0.719 | 2 | 4.344 | 0.602 | 2 | 4.159 | 0.645 | 3 | 3.841 | 0.939 | 2 | 4.200 | 0.407 | 7 | 7.206 | 0.066 |
| Provide healthier working environment | 4.053 | 0.850 | 5 | 4.375 | 0.707 | 1 | 4.023 | 0.849 | 9 | 3.682 | 0.983 | 7 | 4.300 | 0.535 | 5 | 13.372 | 0.004** |
| Enhance reputation of client's companies | 4.000 | 0.811 | 6 | 4.125 | 0.751 | 4 | 4.068 | 0.625 | 6 | 3.795 | 1.047 | 4 | 4.067 | 0.691 | 10 | 1.739 | 0.628 |

Note: **. The mean difference is significant at the 0.01 level of significant.



that green procurement had yet to gain momentum among the Malaysian construction players due to their low level of awareness on green procurement practices. They might be unaware of the positive impacts of green procurement applications towards the environment (Bidin Z et al. 2019).

Achieve “long-term cost savings” is also found to be statistically different across the perceptions of the four groups of respondents. According to Table 1, it was observed that the mean score of the supplier is relatively high (mean = 4.400) when compared to the mean scores of the other three groups of respondents. One obvious reason is that suppliers understand the green and sustainable products best, knowing that these products will yield long-term cost savings. Masia et al. (2020) also captured in their study that most construction practitioners were unclear if the trade-off between the initial high premium costs investing in green building and the long-term savings in operational costs is worthwhile.

There is a significant difference in the view held by the respondents concerning the benefit “providing a healthier working environment”. Table 1 showed that this variable holds a mean value of 3.628 from the point of view of the contractors. This could be explained by the common scenes where contractors concern less about the well-being and health of their workers at construction sites. In the Malaysian construction industry, the foreign workers are the primary labour source at the construction sites as they are cheaper and could endure the unfavourable 3D (dirty, difficult and dangerous) working environments as compared to local workers (Yap and Lee 2020). Liu H et al. (2023) found that majority of green building studies focused on the design phase rather than the construction phase, where air pollution, waste water and solid wastes, noise pollution, and elevated radiation generated by contamination of construction materials from certain construction activities will directly affect the health of workers at construction site. It could be concluded that the benefit of “providing a healthier working environment” is perceived as a less significant benefit among the contractors due to their lack of concerns with the health and well-being of the foreign labours.

CONCLUSIONS AND RECOMMENDATIONS

The construction industry is deemed to be a double-edged sword; the construction industry is regarded as one of the contributors to the economic growth of a country but is also gives rise to environmental issues such as climate change and global warming. As the green efforts in the construction industry have just started to gain traction in recent decades, challenges remained such as that of urging the construction practitioners to adopt green initiatives like the green procurement policy. The adoption of green procurement practices, such as to procure green materials, services and technologies along the construction process, is still slow in the Malaysian construction industry.

To appraise the potential benefits of green procurement applications in the construction industry, a survey involving the key stakeholders was employed to gather their perceptions. From the quantitative analyses, the benefits were prioritised with the five most significant benefits being “reduce pollution levels”, “improve community health and quality of life”, “conserve natural resources”, “reduce GHG emission” and “provide healthier working environment”. The findings further suggested that the respondent groups have differing perceptions on five out of the eleven benefits investigated. The adoption of green procurement will help the construction firms to gain competitive advantages among their peers.

This study can make a worthwhile contribution to the Malaysian construction industry and beyond. It discloses the benefits of green procurement adoption towards the environmental, economic, and social welfare of the country. As the issues of environmental degradation are getting serious, it is imperative for the government and organisation to realise the benefits of green procurement and implement it accordingly with the intention to alleviate the negative environmental impacts caused by the construction activities. This study helps stakeholders to have a good understanding of the benefits possessed by green procurement lays the fundamentals to practice green procurement and devise policies for sustainability in construction.



Note:

This is a shorten article for Berita QS. For full article, refer to Yap, J. B. H., Teh, Y. H., Loo, S. C., & Sulaiman, Z. B. (2023). Benefits of green procurement: perspectives from the Malaysian construction industry. International Journal of Construction Management, 1-10.

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Building Material Prices December 2023



Building Material Prices for December 2023



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