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SEMINAR: EXPLORING 5D BIM – QUANTITY EXTRACTION

In the realm of construction cost management, Building Information Modeling (BIM) has emerged as a transformative tool within the Architectural, Engineering, and Construction (AEC) domain. Among its various iterations, "5D BIM" has gained significant traction, incorporating dimensions of 3D, Time, and Cost. This evolution represents a pivotal advancement in enhancing productivity and efficiency on construction projects.

5D BIM, integrates traditional BIM functionalities with cost-related data, offering a comprehensive approach to project management. This seminar delves into the growing prominence of 5D BIM within construction cost management, elucidating its multifaceted advantages and the reasons behind its increasing adoption by project cost management entities.

The integration of 5D BIM introduces a paradigm shift in cost estimation processes. By leveraging 3D models, cost consultants can extract quantities more accurately, facilitating the inclusion of productivity allowances and pricing values in their calculations. This capability streamlines the entire cost estimation process, from initial planning to project execution, resulting in more precise budget forecasts and better-informed decision-making.

The process of cost estimation with 5D BIM typically begins with the extraction of data from 3D models, which are then imported into BIM-based cost estimation software. This facilitates the preparation of quantity take-offs, a crucial step in determining the materials and resources required for construction. Subsequently, the Bill of Quantities (BOQ) is formulated based on the extracted data and exported to an external database for further analysis and documentation.

The adoption of 5D BIM in construction cost management signifies a shift towards more integrated and data-driven approaches to project delivery. By incorporating cost-related information into the BIM environment, stakeholders can collaborate more effectively, identify potential cost savings, and mitigate risks early in the project lifecycle.

In the subsequent sections of this report, we will delve deeper into the advantages of 5D BIM in construction cost management, explore its practical applications, and examine best practices for implementing this innovative technology in the AEC industry. Through a comprehensive understanding of 5D BIM's capabilities and potential, organizations can harness its transformative power to optimize project outcomes and drive greater efficiency and sustainability in construction projects.

The primary objective of the seminar is twofold:

Fostering Collaboration for Digitalization of Cost Management and Cost Engineering Strategy in the Construction Industry:

The seminar aims to facilitate collaboration among institutions involved in the construction industry to promote the adoption of digital tools and strategies for cost management and cost engineering. By bringing together stakeholders from academia, industry, and government, the seminar seeks to identify opportunities for leveraging technology to streamline cost-related processes, improve efficiency, and enhance project outcomes.

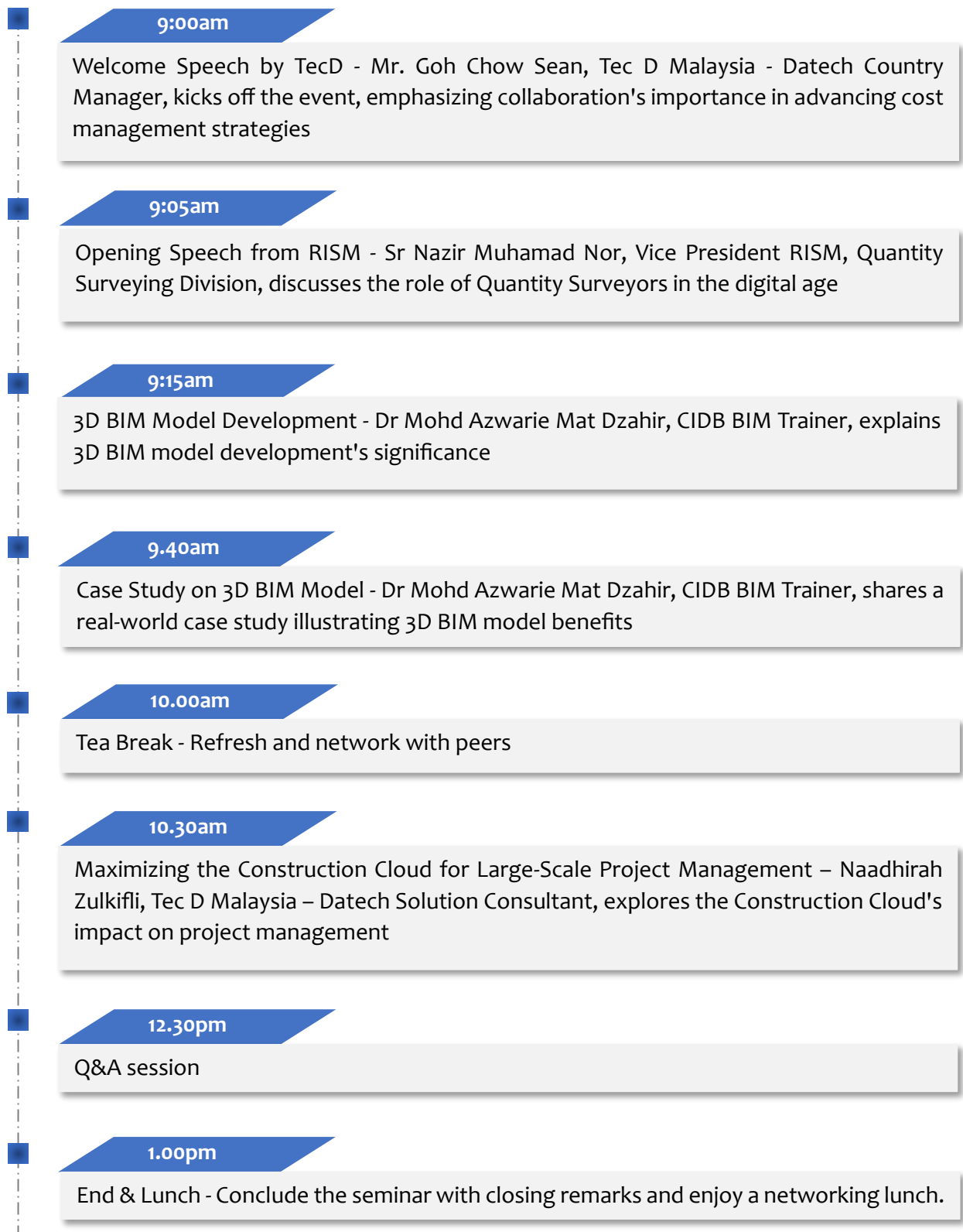
Exploring 5D BIM for Digital Quantity Measurement in Quantity Surveying:

Another key objective is to provide insights into the application of 5D BIM (Building Information Modeling) for digital quantity measurement in Quantity Surveying. The seminar will delve into the capabilities of 5D BIM in accurately estimating quantities from 3D models, incorporating time and cost dimensions. Through presentations, case studies, and interactive sessions, participants will gain a deeper understanding of how 5D BIM can revolutionize quantity surveying practices, improve accuracy, and streamline workflows.

By achieving these objectives, the seminar aims to contribute to the advancement of the construction industry by promoting the adoption of digital technologies and innovative strategies for cost management and quantity surveying. Participants will have the opportunity to share knowledge, exchange best practices, and collaborate on initiatives aimed at driving efficiency, sustainability, and competitiveness in the construction sector.



The meticulously planned sequence of events during the visit unfolded with utmost precision as follows:





GREEN BUILDING VS. GREEN CONSTRUCTION

1.0 INTRODUCTION

Construction is a major industry around the world, accounting for a significant proportion of most countries' Gross Domestic Products (GDP). The growth of many countries, especially the growth of the developing countries, is measured with reference to the tangible development of construction projects. In Malaysia, the GDP from construction increased to RM16,656 Million in the first quarter of 2019 from RM16,418 Million in the fourth quarter of 2018. The GDP from construction in Malaysia averaged RM11,773.19 Million from 2010 until 2019, reaching an all-time high of RM17,207 Million in the third quarter of 2018 and a record low of RM6,464 Million in the first quarter of 2010. The construction projects have become more critical and gained more attention from the government and stakeholders with the main focus to improve the performance of the construction industry in terms of cost, time, and quality.

The construction industry in the developed nations plays a vital role in meeting the needs of society, enhancing the quality of life and providing extensive economic benefits. In the United States for instance, the construction industry is valued at over \$1 trillion and provides critical infrastructure to support many other subsidiary industries, while creating over 6.5 million jobs at the same time. In Europe, the construction industry provided the largest contribution to the employment rate with over 7.5% of all employment, and the largest contribution to the economy with 9.7% of the GDP and 47.6% of the gross fixed capital formation in 1999. Further, in Australia, the construction industry from 2008 to 2009 was valued at \$151.3 billion, which contributed 7.0% of GDP and employed 9.1% of the workforce, making it the fourth largest industry in Australia.

In view of the construction industry in Malaysia, the industry has contributed 3.0% to 5.0% to the GDP over the past 20 years and has played a vital role in the country's. As Malaysia moves towards a sustainable lifestyle and progressive development, the need to prepare for the change is imperative. Sustainability has become an important initiative being discussed and implemented for both private and public buildings, including residential, office, and commercial buildings as well as the hospital. Although sustainability is a generic concept, its pivotal focuses are rather straightforward, which are to improve people's health and the environment, and these can be ascertained from the way people design, construct, and operate the buildings.

In light of providing sustainability, green construction is regarded as one of the best initiatives, considering that its core objectives are directing towards better health and sustainable development. Green construction activities attempt at conserving energy, land, water, and material for the sake of reducing the negative effects to the environment while assuring continual essential demand on quality and safety during the construction projects. Green construction requires contractors to plan and manage necessary actions throughout the construction process to minimise the adverse impacts on the environment.

These actions include improving the efficiency of the construction processes, conserving energy, water, and other resources and minimising the amount of construction waste. As a result of these promising prospects from green construction, green construction has gained an increasing attention in the global context. Therefore, the documentation of a comprehensive guide or standard is crucial towards increasing the public awareness and understanding on the importance of sustainable development practices through the green concept and green construction practices.

Definition and Concept of Green Construction

Construction is a process of building production that requires a significant amount of investment, building materials, equipment, and complex technologies. Construction is the main contributor to the environmental problems caused by the improper construction waste management and excessive consumption of resources and energy. Such improper construction planning and management have led to the increasing of carbon emissions, climate change, scarcity of resources, and waste generation. As a result, green construction has been introduced and has received increase in attention from the government and the construction stakeholders to minimise the environmental issues related to construction.

There many green construction definition parameters related to factors of green construction innovation such as green technology, efficient resources, and organisation management and supervision. The current practices definition can also be part of green construction innovation if it is well implemented such as environmental requirement, land saving, water saving, material saving, eco-labelling, waste minimisation, health and safety, improve quality, operation and maintenance, research and development and training.

The challenges for the implementation of green construction from the overall definition of green construction are the public awareness, knowledge and understanding, and high upfront cost. The following definition is suggested to suit the current Malaysian construction environment and as part of the national agenda to intensify green awareness and understanding, and to promote the implementation of green construction and innovation.

“Green construction is a process undertaken during construction that requires construction stakeholders to aware, understand and implement the current practices and innovation (environmental requirement, efficient resources, health and safety requirement, green technology, energy minimisation, organisation management and supervision , improve quality, material saving, water saving, waste minimisation, land saving, eco-labelling, research and development and training) to improve the conventional construction and environment.”

The following Figure 1 illustrates the green construction concept and definition of this paper derived from the definition suggested above. It includes the green construction practices, green construction innovation, and awareness and understanding which are important for the benefits and implementation of green construction.

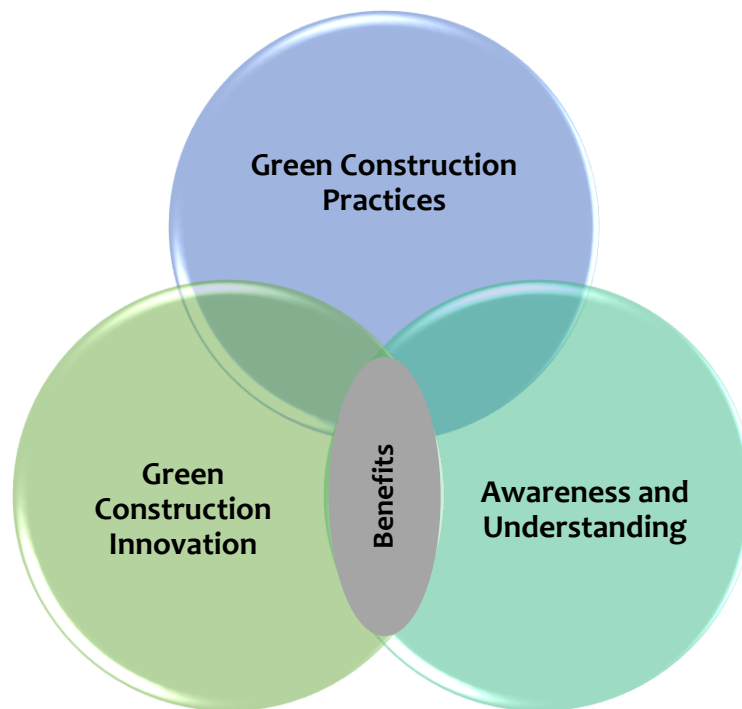


Figure 1: Green Construction Concept and Definition

Green Building Versus Green Construction

Having discussed the definition of green construction, it is also important to discuss the differences between green building and green construction. Green construction is a significant link to construct green building. Green construction can be categorised as land efficiency, energy efficiency, material efficiency, water efficiency and environmental protection by means of scientific management and technical progress while assuring essential demand such as quality and security. The general goal of practicing green construction is to responsibly satisfy the needs of human development.

In the United States, the commercial and residential buildings are estimated to discharge 30% of the greenhouse gases and consume 65% of electricity. Therefore, green construction practices have been introduced to improve the energy consumption, reduce the pollution, and advocate the reuse and recycle of materials. In Sweden, for example, the current practices of green construction are being encouraged by the authorities, particularly in the area of green procurement and environmental aspects with the intention to reduce the cost incurred in a project and minimise the occurrence of environmental risks.

Green construction initiatives in the United States and Hong Kong focuses on enhancing biodiversity, improving air and water quality, controlling noise, reducing solid waste, and conserving natural resources. Green construction in China is realised through a proper planning, design, production of construction materials, construction, installation, operation, maintenance, and management of construction environment. Besides, appropriate scientific management, for instance, the occupational health and safety management, OSHAS 18001, and advanced technology are important in guaranteeing the health and safety aspects during the construction projects.

Research and development (R&D), environmental management system (EMS): ISO 14001, and reuse and recycle are also essential parts of the current practices in most countries which serve to improve the environmental performance. It can be observed that country like Japan, UK, Sweden, Spain, Australia, and the USA are actively implementing EMS standard in the construction industry and continuously encouraging the use of renewable resources. EMS enables organisations to resolve environmental problems, reduce production cost, enhance the competitiveness of products in the international market, and increase the profit margin for the construction organisations. However, in Malaysia, the area of green construction is still new, and its current practice is more directed towards creating awareness and understanding of the implementation of green construction.

To date, there is no specific green construction rating system or tools established in Malaysia. However, there are elements of green construction which are embedded in the green building rating systems namely sustainable site planning, materials and resources, and innovation. Table 1 summarises the similarities between green building and green construction in the Malaysian context.

Table 1:

Similarities between Green Building and green construction (Malaysia Perspective)

Green Building Rating System (GBI)	Green construction
Energy Efficiency (operation and maintenance)	-
Indoor Environmental Quality (operation and maintenance)	-
Sustainable Site Planning and Management	✓
Material and Resources	✓
Water Efficiency (operation and maintenance)	-
Innovation	✓

Green Building Rating System is the assessment of the overall process of green building from its inception until operation and maintenance; to obtain the green building certification (platinum, gold, silver and certificate). In view of green construction, the area is focuses on the process during construction and for the purpose of sustainable development. Figure 2 shows the different stages of project life-cycle for green building assessment and green construction.

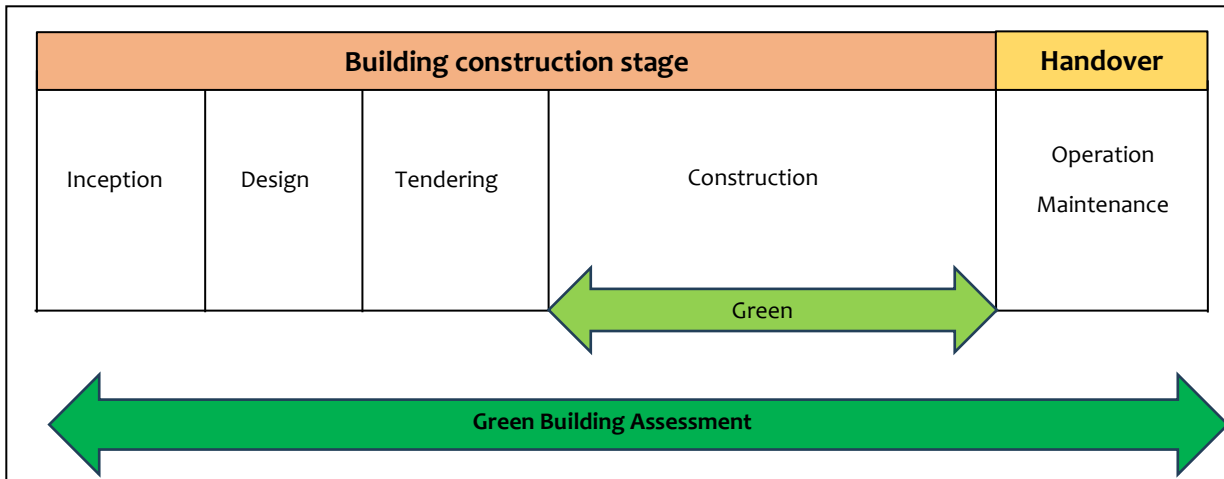


Figure 2: Different stages of building construction for green building and green construction

In light of the building rating systems, many countries have established and adopted the systems, for instance, Green Building Index (GBI) in Malaysia, LEED in the United States, BREEAM in the United Kingdom, CASBEE in Japan, Green Mark in Singapore, Green Star in Australia, Korean Green Building Certification System (K-GBCS) in Korea, and Deutsche Gutesiegel Nachhaltiges Bauen (DGNB) in German. These systems outline specific guidelines that help and monitor the construction stakeholders to deliver the green construction practices into their projects.

The assessment tools like the building rating systems specifically aim at improving occupant well-being, environmental performance, and economic returns of buildings. The following Table 2 illustrates the comparison of the green assessment tools in various countries. Six criteria are found to be the most crucial in assessing green building; optimise energy usage (8), protect and conserve water (8), enhance indoor quality/health and well-being (7), optimise site/land potential (6), use of environmentally preferable product/material (6), and innovation (5). The remaining 12 criteria namely; location and transportation (4), pollution (4), management (3), outdoor environmental on-site (3), integrative process (2), maintenance practice (2), off-site environment (2), waste (2), design (2), socio-cultural and functional quality (1), regional priority (1), and quality of service (1) are less important in some of the countries because of the different nature of construction practice and policy of their respective governments.

In Malaysia for example, the Green Building Index only focuses on the six criteria, namely energy, site, water, indoor quality optimisation, the use of green product or

material, and innovation, while other criteria are yet to be included. However, it can be observed that Malaysia is progressing towards the establishment of green construction and many areas are expected to be explored such as location and transportation, waste management, outdoor environment of the site, and pollution control. These criteria are considered as the most prominent aspects in other countries like the United States, United Kingdom, Japan, Australia, and Singapore as they are already advanced in many aspects of green construction. Therefore, the areas of green construction in Malaysia should be further improved and enhanced to be at the same level or on par with the other advanced countries.



Table 2:

Comparison of Green Building Rating Tools

Green Rating Tools	Criteria of green building																		
	Optimise Energy Usage	Protect and Conserve Water	Enhance Indoor Quality / Health and Wellbeing	Optimise Site / land Potential	Use Environmentally Preferable Product / materials	Innovation	Location and Transportation	Pollution	Management	Outdoor environment on site	Integrative Process	Maintenance Practice	Off-Site Environment	Waste Reduction	Design	Sociocultural and functional quality	Regional Priority	Quality of service	
GBI (Malaysia)	✓	✓	✓	✓	✓	✓													
LEEDS (U.S)	✓	✓	✓	✓	✓	✓	✓				✓							✓	
BREEAM (U.K)	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓					
CASBEE (Japan)	✓	✓	✓		✓					✓			✓						✓
GREENSTAR (Australia)	✓	✓	✓	✓	✓	✓	✓	✓	✓										
GREENMARK (Singapore)	✓	✓	✓			✓		✓		✓									
K-GBCS (Korea)	✓	✓	✓	✓	✓			✓							✓				
DGNB (German)	✓	✓		✓			✓		✓	✓	✓	✓	✓	✓	✓	✓			
Total	8	8	7	6	6	5	4	4	3	3	2	2	2	2	2	1	1	1	

Conventional Construction Versus Green Construction

It is obvious that the construction industry consumes a large amount of energy and resources which can seriously pollute the environment. Construction and the operation of building account for 40% of total energy usage and 16% of total water withdrawals. Construction also accounts for 40% of the construction waste disposal from nearly around 3 billion tons of raw materials for the global use every year. Several green buildings are reported to consume 26% less energy and contribute 13% reduction in maintenance cost when compared to the average commercial buildings. In the attempt to reduce the energy consumption and pollution, green construction has been introduced in the construction industry.

Green construction has its roots in construction, thus it is essential to clearly explain the concept from which green construction emerged. Green construction is the current and future dominant concern which become the headlines in most of the countries around the world because of the worrying perception over the increase of world population. In the early years, human population needed more than forty years to reach one billion, but in recent years, the world population has only needed less than twelve years to reach the same amount.

In view of the green construction concept, green construction can be described as a modernised construction or an innovation to the traditional construction. It intends in minimising the use of resources and energy, and reduce the negative effects to the environment. More often than not, the construction cost for green construction is much more expensive as compared to conventional construction because it involves higher overhead, advanced technology, and new expertise. However, in terms of a long-term investment, green construction provides more value for money to the clients and end user due to the low maintenance cost and saving of energy and resources.

Hence, this section is aimed to describe what is generally recognised as green construction, investigate the concept and nature of green construction and how it differs from conventional construction. There is a reasonable volume of literature that attempts to illuminate the differences between green construction and conventional construction. Table 3 summarises some of the major differences between green construction and conventional construction taken from several authors in the area of green construction.

Table 3:

Green Construction vs Conventional construction

Green construction	Conventional construction
Improves the environmental performance.	Major contributors to environmental problems i.e. noise, air and water pollution.
Encourages the use of renewable resources.	Most of the resources consumed are non-renewable.
Resources and energy saving.	Consumes a lot of resources and energy.
Area or land saving.	Requires a large area for construction.
Minimises the amount of construction waste.	Generates a lot of construction waste.
Major concerns are to improve efficiency of resources usage and protect the environment.	Major concern is to improve construction performance i.e. time, cost, and quality.
Requires advanced construction technology and comprehensive scientific management.	Uses obsolete and complex technology.
Reduces the effect of greenhouse and reduce carbon dioxide gas emissions.	Contributor to the greenhouse and carbon dioxide gas emissions.
High initial cost but long term investment benefits.	Requires a significant investment in planning, construction, and maintenance.
Able to cope with a huge demand by utilising appropriate technology.	Unable to cope with a huge demand.
Improves the project delivery i.e. quality, health and safety and environment.	Major problems are delay projects, poor quality and workmanship, health and safety, and project failures.

Table 3 clearly indicates that green construction provides a lot of advantages as compared to conventional construction such as improving the environmental performance, encouraging the use of renewable resources, and maximising the project delivery i.e. in terms of quality, health and safety, and the environment. It can also be observed that green construction has a disadvantage particularly in its higher initial cost, but in a long run, green construction offers a long-term investment benefits.

In contrast, conventional construction has some apparent disadvantages particularly in contributing to the environmental pollutions and project failures such as delays in projects, poor quality and workmanship, and poor health and safety. Besides, it requires a large land area for construction, consumes a lot of resources and energy, and generates a lot of wastes. The conventional construction practices, in general, may destroy the environment as a consequence. It is evidently recognised that conventional constructions are ones of the major contributors to the environmental problems, particularly because of the utilisation of non-renewable materials. The disadvantages of conventional construction have led the Malaysian construction industry to progressively change from conventional construction to green construction. In addition, the construction stakeholders will become more alert to the disadvantages of conventional construction and aware of the benefits of implementing green construction.

Understanding the disadvantages and benefits of green construction will help the construction stakeholders to plan thoroughly during the early stage of construction. Therefore, a proper planning will ensure the success of green construction implementation. The subsequent section will discuss the current practice, benefits, disadvantages, green construction innovation, and major challenges for the implementation of green construction.

Green Construction in the Malaysian Environment

The construction industry in Malaysia plays an important role in social and economic infrastructures and buildings apart from generation of country wealth. The industry provides job opportunities for 800,000 people which represented 8% of total workforce. The construction industry is one of the productive sectors that constantly contribute to the economy (CIDB, 2011). In 2012, it recorded 18.5% of growth, the highest since 1995 (21.1%). Its share has increased the country's GDP to 5.6% from 5.1% in 2011. The outstanding expansion of growth is mainly driven by the civil engineering sector with the commencement and progress of several infrastructure projects, followed by the residential and non-residential sectors with the construction of high-end properties, industrial as well as commercial projects. The construction industry creates a multiplier effect to other industries, including manufacturing sector, financial and banking, agriculture, mining and professional services and has predicted by many as the catalyst of economic recovery and as a driver for the modernisation of Malaysia.

Construction industry is a major consumer of non-renewable resources and a massive producer of waste, and the operation of buildings is responsible for around half of the total CO₂ emissions. Based on recent study in developed countries, 30-40% of natural resources were exploited by building industry, 50% of energy used for heating and cooling in buildings, almost 40% of world consumption of materials converts to built environment and 30% of energy use due to housing. The similar percentage is expected in the developing countries including Malaysia. This is a huge amount of resources and energy consume in the building life-cycle, let alone the usage of resources and energy

during the construction phase. It was recorded that more than six million tons of waste has been generated which quarter was produced in the Klang Valley alone, the most affluent area in Malaysia, and today, solid waste issue is one of the biggest environmental problems in Malaysia.

The construction exploits natural resources such as forest for timber, housing and industry without proper control contributes to the environmental problems. Many of environmental issues that occur in this country are due to lack of environmental considerations in the exploitation, development and management of resources as well as lack of control of pollution resources. These issues if not tackled strategically will further aggravate and exert challenges towards sustainable construction in the following way. It was observed that the Malaysian construction industry is still behind in waste management, rainwater harvesting and reduction of carbon footprint as compared to the developed nations.

For instance, improper waste management always receives insufficient support from contractors. Most of the contractors in Malaysia choose to dispose their waste by illegally burning or burying them at construction site besides sending the debris to landfill. Not all contractors are willing to pay extra money for waste collection service. Majority of contractors would prefer to self-dispose the waste at their convenience.

Regardless of the environmental issues, there are still problems reported like project delays and project failures. Besides, there are also serious problems reported such as insufficient mobilization, management and supervision. Hence, it is important for construction stakeholders to include standards like OSHAS 18001 and ISO 14001, along with management aspects like material saving plan, water saving plan, energy saving plan, and natural resources saving plan in their construction projects as part of the green construction requirements

Many governments worldwide have undertaken to initiate and implement national sustainable developments. Malaysian in fact, is one of the earliest nations in the world to have adopted a serious concern towards our environment by enacting the Environment Quality Act way back in 1974. In 2009, the government of Malaysia had introduced National Green Policy. The policy aims at providing guidance for businesses and industries in Malaysia and bringing positive impact to the national economic growth with low carbon economy. Besides the legislative initiatives, the government also provided effective financial initiatives through Green Technology Financial Scheme. This scheme was established to encourage investment in green technology.

Prime Minister of Malaysia in his speech at the United Nations Framework on Climate Change Conference (Copenhagen Summit) stated the commitment of Malaysia to reduce the carbon dioxide emission by as much as 40% compared to the 2005 levels. As the results, the Malaysian government has working on the Green Technology Roadmap to guide Malaysia in becoming a low carbon green growth economy. For a

start, the government is conducting a baseline study for green technology in Malaysia. The baseline study comprises the following sectors; energy, waste water, building, transportation, manufacturing, and ICT.

The effort in enhancing construction players' commitment in sustainability is not being confined to the government only. Construction Industry Development Board (CIDB) Malaysia has also played significant roles to promote the importance of sustainability in construction industry. In 1999, CIDB initiated Green Technology programme, which has so far published several standards, guidelines, and manuals for practitioners' references. They also have organised seminars to enhance the awareness of construction players on the importance of sustainable construction concept.

The aforementioned differences between green construction and green building have geared up the government to incorporate the elements of green construction such as sustainable site planning and management including material and resources efficiency in the Green Building Index (GBI) rating system in Malaysia. Since 2008, the green building rating system has become mandatory for all new buildings. Therefore, it can be as part of system that can assist the construction stakeholders to implement green construction.

This is because there is no green construction rating system available Malaysian Construction Industry at the moment. Table 4 shows the criteria under GBI for both Non-Residential and Residential buildings which include energy efficiency, indoor environmental quality, sustainable site planning and management, material and resources, water efficiency, and innovation. Examples of the non-residential building are commercial and industrial building, educational building, office building, and healthcare building. The highest rating point for non-residential is for energy efficiency and the lowest rating point is for innovation. Meanwhile, for residential building, the highest rating point is for sustainable site planning and management and the lowest rating point is for innovation.

It can be suggested that the energy efficiency is critical for non-residential building because it involves a great number of buildings and occupants compared to the residential building. Sustainable site planning and management, on the other hand, is crucial for residential building because the needs of occupants are more concerned with the strategic location, transportation, and public amenities. Nevertheless, innovation scores the lowest point for both non-residential and residential buildings because innovation in Malaysia is still in the early stage and in the process of advancing gradually. In order to cope with innovation deficiency, there are a lot of government initiatives to transfer new technologies and innovations to Malaysia and also through knowledge sharing from countries like the United States, United Kingdom, and Singapore.

Table 4: GBI Malaysia Rating

Item	Maximum points (%)	Maximum points (%)
	Non-Residential	Residential
Energy Efficiency	35	23
Indoor Environmental Quality	21	11
Sustainable Site Planning and Management	16	39
Material and Resources	11	9
Water Efficiency	10	12
Innovation	7	6
Total	100	100

Table 5 illustrates the GBI classification of green building which are “platinum,” “gold,” “silver,” and “certified.” The GBI ratings are based on the total score awarded. The highest GBI rating is platinum starting from 86 points and above, gold starting from 76 to 85 points, silver starting from 66 to 75 points, and certified starting from 50 to 65 points.

Table 5: Green Building Index Classification

Points	GBI rating
86 points and above	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

GBI classification of green building which is divided into platinum, gold, silver, and certified. The GBI ratings are based on the total score awarded. The highest GBI rating is platinum starting from 86 points and above, gold starting from 76 to 85 points, silver starting from 66 to 75 points, and certified starting from 50 to 65 points.

The challenge of the high cost of green technology arose when the requirements were changed from the conventional to green building construction. The scarcity of the green material seems to be one of the important factors that lead to high construction cost. Some of the materials need to be imported because the industry and the green market are still new. However, green materials are now available in Malaysian’s market since 80-90% government projects are using IBS.

In one of the green building project, the initial project was using conventional construction but upgraded into the green building at the middle of construction. Therefore, the client needs to spend additional of 20 Million for the upgrading and misses out the score of Green Building Index at the planning stage.

In more advanced countries like China, Singapore, and the UK, implementation of standard environmental assessment tools is enforced to promote sustainability. However, there is a lack of enforcement of the environmental impact assessment tools to measure the building life-cycle and performance in the construction projects. The efficiency of natural resources and building energy utilization are presently unsatisfactory. There is currently lack of suitable legislation and tax adjustment measures which can be used to regulate the —3Rs – Recycling, Reduce, and Reuse of construction waste. The low concentration on the economic gain in the construction industry alone has negatively affected the long-term performance of the building products. The poor awareness among construction firms towards the social and environmental sustainability has also constrained the progress of improving the construction industry with regard to green building construction.

Currently, there is no specific green building construction rating system or tools established in Malaysia. However, there are elements of green construction which are embedded in the green building rating systems namely sustainable site planning, materials and resources, and innovation. Green Building Rating System is the assessment of the overall process of green building from its inception until operation and maintenance.

From the critiques and discussions of existing literature, it can be deduced that the concern of the environment is relatively low and the environmental sustainability is still new and vulnerable in most of the construction developments in Malaysia. However, with the growing awareness of environmental protection, these issues would gain a wider attention by the construction practitioners all over the world. Therefore, the construction industry must transform its conventional methods of construction that have little regard on the environmental concerns to practices that care for the environment. The environmental concerns show significant influences on green construction which include the use of renewable resources, resources and energy saving, land saving, waste and water minimisation, advanced construction technology, and comprehensive scientific management.

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CAREER OPPORTUNITIES FOR QUANTITY SURVEYORS IN CONSTRUCTION CLAIMS CONSULTANCY WORK

1.0 INTRODUCTION

In Malaysia, the resolution of construction project disputes predominantly takes place through various channels, including arbitration, litigation, mediation, and statutory adjudication. These disputes have been linked to legal proceedings involving substantial financial stakes, with Asia emerging as the continent with the highest monetary involvement. Research conducted in Malaysia and Singapore identifies finance and time overruns as the most prevalent types of disputes in the Malaysian construction industry. To address these challenges, the Construction Industry Payment and Adjudication Act 2012 (CIPAA) was enacted, introducing statutory adjudication specifically designed to streamline payment dispute resolutions within construction projects (Kelvin Zhen, 2023). The primary objective of the CIPA Act is to establish efficient and prompt dispute resolution processes. According to Section 37(1), a party has the option to initiate adjudication, arbitration, or litigation simultaneously. Between 2020 and 2021, the worldwide construction industry experienced significant shifts in dispute dynamics. Despite a 3% decrease in the average value of global disputes during this period, levels have remained historically high as compared to the pre-2019 era. The average time required to resolve disputes increased significantly by about 15%, marking the first increase in three years. (Arcadis, 2022).

Construction contract claims represent a pervasive source of disputes in the construction industry. Despite possessing expert knowledge of construction contracts and implementing a sound risk-allocation system, the effective management of claims remains crucial to avoid complications. Poorly managed claims not only disrupt project timelines but also significantly impact project costs. Recognising the complexity of claim resolution, claims consulting emerges as a comprehensive process involving the coordination of resources to navigate the entire lifecycle of a claim—from identification and analysis through preparation and presentation to negotiation and settlement. The primary objective of a claim consultant is to address and resolve issues in an efficient and effective manner, emphasising the importance of avoiding litigation and arbitration in claim settlements (Azmi, 2018).

A significant example of disputes in the Malaysian context involves the common practice of contractors providing performance bonds in the form of bank guarantees to ensure satisfactory performance. Typically drafted as 'on-demand' guarantees, such instruments allow employers to call upon the guarantee without requiring proof of underlying circumstances. However, in cases such as *Sumatec Engineering and Construction Sdn Bhd v. Malaysian Refining Co Sdn Bhd*, the Federal Court introduced a nuance by allowing an injunction against the release of sums under the guarantee if the call is deemed

'unconscionable'. This legal development indicates a recognition of the inflexible nature of on-demand guarantees, highlighting the importance of ethical considerations in their execution. Malaysian case law demonstrates the varying interpretations of what constitutes 'unconscionable,' emphasizing the need for a nuanced and context-specific approach in claim resolutions (Wen, 2022). This aligns with the broader trend in the construction industry, where an increasing number of claims underscores the demand for higher expertise in claims consulting work. This research aims to investigate the career prospects available to quantity surveyors in the field of construction claims consultancy within the Malaysian construction industry. While the objectives are:

- i. To identify the essential skills and qualifications required for quantity surveyors engaging in construction claims consultancy work.
- ii. To explore the roles and responsibilities of quantity surveyors in the management and resolution of construction claims.
- iii. To investigate the career prospects accessible to quantity surveyors in construction claims consultancy work.
- iv. To explore the challenges faced by quantity surveyors in the Malaysian construction industry.

2.0 LITERATURE REVIEW

2.1 The Development Of Quantity Surveying As A Profession In Malaysia

Quantity surveying as a profession in Malaysia has a rich history dating back to the 1930s and 1950s. The profession was introduced to Malaya (now Malaysia) by British quantity surveyors who set up practices in the region. Over the years, the profession has evolved to meet the changing needs of the construction industry, with quantity surveyors being responsible for a wide range of tasks related to construction costs, financial management, and contractual administration. The development of the profession has also been influenced by the education and training of local professionals to meet the specific needs of the Malaysian construction industry. Today, there are over 1000 qualified quantity surveyors in Malaysia, with a few hundred more in training (Yun, 2017).

2.2 The Opportunities And Career Advancements Of Quantity Surveying In Malaysia

In terms of education and training, Malaysia offers diploma programs in quantity surveying that provide essential knowledge and skills for aspiring quantity surveyors. Additionally, professional certification and registration with the Royal Institution of Surveyors Malaysia (RISM) are important steps for those pursuing a career in quantity surveying in Malaysia. After successfully completing a quantity surveying course, graduates have the opportunity to explore various career paths, including roles such as building surveyor, building material manager, construction executive, contract executive, cost manager, project coordinator, and quantity surveyor (Edu Advisor, 2022).

2.3 The Roles And Responsibilities Of Quantity Surveyors In Construction Projects

Quantity surveyors play a pivotal role in laying the groundwork for project success. Their responsibilities encompass cost estimation, involving a thorough examination of architects' and engineers' building plans, as well as the measurement and estimation of building and material costs. They prepare comprehensive reports outlining the anticipated building costs for clients. Additionally, quantity surveyors manage the tendering process for contractors and subcontractors, which involves the preparation of tender documents, assessment of tenders, and providing recommendations to clients. Beyond these duties, quantity surveyors provide clients with financial advice and estimates, and they may engage in mediations and arbitrations related to building contracts. Essential skills for quantity surveyors in this phase include the ability to interpret building plans, estimate building and material costs, and effective oral and written communication (Gaurav, 2016).

2.4 Construction Claims Consultancy

Construction projects are complex endeavours involving multiple stakeholders, intricate planning, and precise execution. In the course of these projects, disputes and challenges may arise, necessitating the expertise of construction claims consultants.

2.4.1 Definition of Construction Claims

Construction claims in the construction industry refer to formal requests for compensation or an extension of time due to circumstances affecting a project. They are important in construction projects as they help address disputes over the project's scope, cost, quality, or duration, and can lead to fair resolutions. A construction claim arises when one party, often the contractor, asserts the need for more time and/or payment due to the other party's failure to fulfil their contractual responsibilities (Rahman, 2022)

2.4.2 Types of Disputes and Issues in Construction Claims

Construction claims can arise from various factors, including changes in project scope, unforeseen physical conditions, design deficiencies, incomplete design information, and poor management of subcontractors and suppliers. These claims can lead to disputes between the parties involved in a construction project, resulting in formal requests for compensation or extension of time. Therefore, construction claims can be categorized into various types based on different criteria. Some of the common types of construction claims include:

i. **Delay Claims**

Delay claims arise when a construction project exceeds the initially agreed-upon timeline. Various factors can contribute to delays, such as unforeseen site conditions, alterations in the scope of work, issues with approvals and permits, among others (Vijayan, 2023).

ii. Cost Overrun Claims

Cost overrun claims arise when the actual costs of a construction project surpass the initially budgeted amount. Reasons for cost overruns can range from changes in the scope of work and inflation to escalated materials costs and other contributing factors (Vijayan, 2023).

iii. Design Deficiency Claims

Claims related to design deficiencies emerge when the design documents supplied by the architect, engineer, or owner contain mistakes or omissions (Vijayan, 2023).

iv. Changes in Scope Claims

Claims related to changes in scope arise when the scope of work for a construction project undergoes modifications after the contract has been executed. These alterations in scope may stem from various factors, such as shifts in the owner's requirements, the identification of unforeseen site conditions (Vijayan, 2023).

v. Payment Disputes

Disputes over payments may arise in a construction project when a contractor or subcontractor believes they have not received the full

amount owed to them. The causes of such disputes can range from misunderstandings regarding the scope of work to disagreements on the quality of the work performed, among other factor (Vijayan, 2023).

vi. Quality of Work Claims

Claims related to the quality of work may arise when the construction performed on a project fails to meet the standards outlined in the contract documents. Various factors, such as insufficient training and equipment, deviation from proper construction methods, or a lack of quality control measures, can contribute to quality of work claims (Vijayan, 2023).

vii. Warranty Claims

Claims under warranty emerge when a flaw or issue with the completed work on a construction project is identified after the project's conclusion. Various factors, such as substandard workmanship, the utilization of defective materials, or a failure to adequately maintain the work, can contribute to warranty claims (Vijayan, 2023).

viii. Termination Claims

Termination claims arise when one party terminates the contract for a construction project before it has been completed. Causes of termination can include a breach of contract by one of the parties, a failure to make progress on the project, or other factors (Vijayan, 2023).

ix. Liquidated Damages Claims

Claims for liquidated damages arise when a predetermined sum is imposed for each day of delay in completing a construction project. These damages are typically stipulated in the contract documents to serve as a deterrent for the contractor to meet project deadlines and to compensate the owner for any resulting delays (Vijayan, 2023).

x. Performance Bond Claims

Claims against performance bonds arise when a contractor fails to fulfil the specified work outlined in the contract, or when a subcontractor neglects their contracted responsibilities. Such claims may compel the owner to seek an alternative contractor to complete the work, resulting in additional time and expenses (Vijayan, 2023)

2.4.3 The Role Of Quantity Surveyors Relevant To Claims Consultancy

Quantity surveyors are responsible for managing all costs related to building and civil engineering projects, from the initial calculations to the final figures. They seek to minimize the cost and risk of a construction project while still achieving the required legal standards and quality. The roles of quantity surveyors relevant to claims consultancy can be summarized as follows:

i. Contract Administration

Quantity surveyors are responsible for administering construction contracts, such as JCT or NEC, and managing the commercial implications of a project. They ensure that the contract is being followed and that all parties are meeting their obligations. They also manage the financial aspects of the contract, including payments, variations, and claims. Quantity surveyors bear the responsibility of ensuring the project stays within budget, keeping all involved parties informed about the financial status. In doing so, they contribute to the timely and budget-compliant completion of the project (K-Zan, 2023).

ii. Dispute Resolution

Within the construction industry, quantity surveyors are pivotal in the resolution of disputes. Their responsibilities encompass identifying and interpreting contractual entitlements, overseeing variations, and managing claims and disputes. It is imperative that they ensure the alignment of claims with contractual clauses, maintain accurate records, and substantiate claims with proper evidence. Proficiency in claim management is a critical factor for success in the construction industry, and quantity surveyors play an essential role in ensuring the adherence of claims to contractual requirements and supporting evidence (K-Zan, 2023).

iii. Project Management

Quantity surveyors are responsible for managing project budgets, forecasting and monitoring costs, and maintaining accurate project-related records. They work closely with project managers, architects, engineers, contractors, and other stakeholders to

ensure a project is cost-effective and meets quality standards. These professionals typically begin working on a project during the design phase, giving cost estimates associated with the project, such as materials, labour, and equipment. They also prepare tender documents and contracts for the project. During the construction phase, they monitor and manage costs to ensure the project is completed within the budget (ALH Recruitment Ltd, 2024).

iv. Cost Control

Quantity surveyors hold the responsibility of managing costs throughout the construction process, ensuring that the final accounts align with the predetermined budget. In contemporary practices, they are adopting a proactive approach in cost management, going beyond the traditional role of merely preparing budgets for clients with set deadlines and financial constraints. Integral to their duties are tasks like creating bills of quantities, issuing interim payments, and finalizing accounts, typically performed reactively. Despite the reactive nature of these tasks, their importance and necessity in the overall construction process remain significant (Career in Quantity Surveying, 2023)

v. Forensic Examination and Analysis

Quantity surveyors play a crucial role in conducting forensic examination and analysis, particularly in delay analysis and quantum evaluation matters. Their proficiency extends to the ability to conduct feasibility studies and engage in value engineering exercises. Collaborating with stakeholders, they aim to optimize project outcomes and ensure value for money. Possessing exceptional forensic examination and analysis skills, especially in matters of delay analysis and quantum evaluation, they compile thorough reports or arguments outlining facts and legal aspects. These reports serve as formal legal positions, enabling them to represent clients in negotiating settlements or legal proceedings, thereby advancing the resolution of the matter (ALH Recruitment Ltd, 2024).

2.4.4 The Skills Of Quantity Surveyors Required In Claims Consultancy

Quantity surveyors engaging in claims consultancy work require a range of skills and competencies to be successful in their roles. These skills and competencies include technical skills, soft skills, and specialized knowledge of construction claims and disputes. Technical skills are essential for quantity surveyors engaging in claims consultancy work. They must have a deep understanding of construction contracts and regulations, as well as proficiency in project management and cost control (SkillsYouNeed, 2024). Quantity surveyors must also have strong analytical and problem-solving abilities to assess and quantify the impact of variations and changes in projects. They must be able to conduct claims reviews, analyse data, and provide recommendations to both parties involved in the dispute (Anthony, 2022).

Soft skills are also crucial for quantity surveyors engaging in claims consultancy work. They must have excellent communication and negotiation skills to effectively communicate with all parties involved in the dispute. Quantity surveyors must be able to articulate complex information in a way that is easy for the client to understand. They must also be able to build and sustain good relationships with clients to better understand their needs and advise them accordingly (SkillsYouNeed, 2024). Specialized knowledge of construction claims and disputes is also essential for quantity surveyors engaging in claims consultancy work. They must have a deep understanding of the legal and regulatory frameworks that govern construction projects. Quantity surveyors must also be familiar with the different types of claims that may arise in construction projects, such as variations, delays, and defects (Shadi Shayan, 2019). They must be able to provide expert advice on contractual disputes and risk management (Steven Tenny, 2022).

2.5 THE SIGNIFICANCE OF CLAIMS CONSULTANCY

Claims consultancy plays a significant role in mitigating risks and resolving disputes in the construction industry. One of the significant benefits of claims consultancy is its ability to provide an impartial and objective analysis of construction claims. Claims consultancies are not affiliated with any of the parties involved in the project, which allows them to provide impartial and objective recommendations. They have specialized knowledge and expertise in construction claims and disputes, which allows them to provide comprehensive and effective support for construction claims management (Consilium, 2023). By providing impartial and objective analysis, claims consultancies can help prevent disputes from escalating and provide a more efficient and effective resolution of disputes. Claims consultancy also plays a crucial role in managing risks associated with construction projects. By conducting claims reviews, quantity surveyors can identify potential risks and provide recommendations to mitigate them (Ismail, 2024). Claims consultancy aids in the identification and allocation of risks, precise scheduling, the creation of clear project documentation and communication, and the resolution of disputes in real-time (Shaughnessy, 2023). By implementing these risk management approaches, all parties can focus on preventing disputes from arising in the first place, leading to better project outcomes. Moreover, claims consultancy can help resolve disputes in a timely and cost-effective manner. By acting as expert witnesses, negotiators, mediators, conciliators, adjudicators, arbitrators, or expert witnesses, quantity surveyors can provide a fair and unbiased resolution to disputes (Consilium, 2023). This can help prevent disputes from escalating and provide a more efficient and effective resolution of disputes.

2.6 THE CHALLENGES IN CLAIMS CONSULTANCY

One of the significant challenges that quantity surveyors face is economic uncertainty. Economic fluctuations, such as those caused by Brexit, can have a significant impact on the construction market, leading to a decrease in construction projects and, consequently, a reduction in demand for quantity surveyors in claims consultancy roles (Hubbard, 2023). To overcome this challenge, quantity surveyors must stay informed, embrace change, and work collaboratively to deliver successful projects for their clients. Another challenge that quantity surveyors face is managing project costs. With rising material costs and unpredictable market fluctuations, managing project costs is an ongoing challenge for quantity surveyors (Hubbard, 2023). Quantity surveyors must ensure that costs are kept within budget without compromising the quality of the project. They are usually engaged from the outset to conduct feasibility studies, contract administration, and quantity surveying roles in relation to the construction project (BPE Solicitors, 2019). Quantity surveyors must also ensure that they foster strong relationships with suppliers to help secure better prices and negotiate favorable contracts (Hubbard, 2023). Quantity surveyors are required to stay abreast of current requirements and assess the enduring effects of sustainability and environmental regulations on construction projects (Hubbard, 2023). With the ongoing evolution of sustainability and environmental regulations, it is imperative for quantity surveyors to remain informed and contemplate the lasting implications of these regulations on construction projects.

Next challenge that quantity surveyors face is the need to develop specialized skills and competencies required for claims consultancy work. Quantity surveyors engaging in claims consultancy work require a range of skills and competencies, including strong analytical and problem-solving abilities, excellent communication and negotiation skills, deep understanding of construction contracts and regulations, proficiency in project management and cost control, and the ability to adapt to changing project circumstances and respond to challenges (Thomas, 2022). Quantity surveyors must develop these skills to be successful in claims consultancy work.

Finally, quantity surveyors must be aware of their choices and take action to build their careers successfully. They must set objectives and work towards achieving them, such as maximizing their income in the short term, working on a major project, or developing a specialist skill. Quantity surveyors must also be aware of the balance between qualifications and experience when transitioning into claims consultancy work (Thomas, 2022).

2.7 THE CURRENT CONSTRUCTION INDUSTRY TRENDS

The current trends in the construction industry, such as increased emphasis on sustainability, whole-life costing, and carbon foot printing, have a significant impact on the demand for quantity surveyors in claims consultancy work. Quantity surveyors play a crucial role in attaining sustainable construction objectives through adept management

of costs, resources, and environmental impact. Their contribution extends to risk management strategies, where they assess environmental risks and their potential influence on project viability, enabling informed decision-making that upholds the project's sustainability goals. Through the deliberate integration of sustainability considerations into their tasks, quantity surveyors actively influence industry practices and fulfil ethical responsibilities, thereby propelling the advancement of sustainable construction practices (Andrew, 2023).

However, these trends also present challenges for quantity surveyors. Managing project costs in the face of rising material costs and unpredictable market fluctuations is an ongoing challenge. Quantity surveyors must foster strong relationships with suppliers to secure better prices and negotiate favorable contracts, all while considering the long-term impact of sustainability and environmental regulations on construction projects (Hubbard, 2023). Additionally, quantity surveyors need to reskill in green costing and carbon cost planning to meet the needs of sustainable construction, as the profession is expected to evolve to address the demands of sustainable construction (Temitope Omotayo, 2023).

Furthermore, the adoption of new technologies and the increasing knowledge regarding sustainable attributes for construction projects are identified as critical challenges for quantity surveyors. The field is anticipated to evolve by adopting emerging roles, such as the ability to provide sustainable advisory services and proficiency in Building Information Modelling (BIM) for cost management. This evolution is aimed at aligning with the worldwide trend towards sustainable construction (Shadi Shayan, 2019).

3.0 RESEARCH METHODOLOGY

In this research, the qualitative research method has been chosen to effectively address the aim and objectives of the research. This selection is grounded in the nature of the subject matter, which necessitates obtaining comprehensive insights from respondents, specifically claim consultants with expertise in resolving disputes between clients and contractors. The use of interviews in the qualitative research approach facilitates a more seamless attainment of the research objectives, as this method introduces a distinctive perspective capable of adapting to the gathered data information.

In this research focusing on discovering career opportunities for Quantity Surveyors in construction claims consultancy work, the targeted sample population consists of qualified Quantity Surveyors. Employing a qualitative research approach, specifically a non-probability sampling technique known as convenience sampling, will be essential for selecting appropriate respondents within this sample population. The selected individuals will be Quantity Surveyors who possess experience and are currently engaged in construction claims consultancy work. This strategic selection aims to support the

research objective of identifying and understanding career opportunities for Quantity Surveyors in the specific field of construction claims consultancy.

3.1 DATA COLLECTION

The data collection process can be qualitative or quantitative, depending on the research design and objectives (George Tegan, 2022). Hence, for the exploration of career opportunities for Quantity Surveyors in construction claims consultancy work, the chosen research methodology is the semi-structured interview method. The interview questionnaire is meticulously crafted to align with the respondent's knowledge and perspectives on the research topic. In the context of this study, the respondents, namely Quantity Surveyors, will be engaged in discussions concerning their experiences and insights into career opportunities within construction claims consultancy work. Through this method, the responses obtained from the Quantity Surveyors are anticipated to contribute significantly to achieving the aims and objectives of this research, providing a comprehensive understanding of the career landscape in construction claims consultancy work.

4.0 CONCLUSION

In conclusion, exploring career opportunities for quantity surveyors in claim consultancy work within the Malaysian construction industry reveals a dynamic landscape with substantial potential for professional growth. The multifaceted role of quantity surveyors in estimating project costs, managing contracts, and overseeing finances positions them as crucial players in claim resolution. The specialized field of construction claims consultancy adds another dimension to their career path, emphasizing their involvement in dispute management and resolution. By honing their skills and staying abreast of industry trends, quantity surveyors can play a pivotal role in ensuring fair and efficient claim resolutions, thereby contributing to the overall success and development of the construction sector in Malaysia.

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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



The PAQS-Iwata Foundation 2024 Travelling Scholarship Competition

The Pacific Association of Quantity Surveyors established the PAQS-Iwata Foundation in 2008 for the purpose of promoting the QS profession and the professional development of young quantity surveyors in the PAQS region. The Foundation is now sponsoring an international essay competition for young members from PAQS member countries.

The competition winner will receive travel airfares, 3 nights' accommodation and full registration for their attendance at the next PAQS Annual Congress which will be held from **23rd - 27th August 2024** in Brunei Darussalam.

Entries for the competition are now being accepted and will close on **Thursday, 27th June 2024**. Properly completed essays should be emailed to the PAQS Secretariat at secretariat@rism.org.my

Entries will be judged by an international PAQS-Iwata Foundation panel who will announce the result by **19th July 2024**. The panel's decision is final.

The topic for the essay competition for 2024 is

“DIGITALISATION TOWARDS A SMART NATION”

Conditions of entry:

1. Entrants must be 40 years of age or younger and be a member of their national QS/Cost Engineering institute (all grades of members are eligible).
2. The essay must have a cover sheet showing the entrant's name, residential address, email address and the member institute/association to which they belong.
3. The length of the essay is to be between 1,000 to 1,500 words and essays must be typed in accordance with the below rules.
4. All competition entrants agree to give the PAQS copyright for their essays.
5. Any plagiarism by an entrant will result in disqualification of the entry.
6. Entrants agree that if they win the competition, they will attend the PAQS Congress (and present their paper if invited to do so by the Congress committee).
7. The award is not transferable and not convertible to cash.
8. The winner agrees to write and submit a one (1) page report on their attendance at the PAQS Congress to the PAQS Secretary within 4 weeks of attending the Congress - this report may be published in the PAQS Newsletter and member journals/newsletters.
9. Entries must be emailed to the PAQS Secretariat at secretariat@rism.org.my by the closing date.
10. PAQS member institutes will be asked to translate essays into English where they have been submitted in another language.
11. Each entrant is only allowed to submit one (1) paper.
12. A person is only allowed to win this competition twice.

Rules for essay writing and submission - entries are to be:

1. typed in a MS Word compatible program
2. with type font being Arial size 11
3. lines are to be double spaced
4. Headings are to be Arial size 16, centred and bold
5. Sub headings are to be Arial size 12, left indented and bold
6. Footnotes and referencing are to be in accordance with the Harvard system eg:
Smith, T. and Tang, H. (2006). The rise of globalisation in the QS profession. Australasian Journal of Quantity Surveying Vol 4 Issue 2, pp 34-36.

Note:

The PAQS-Iwata Foundation has been named in honour of Mr Toshiyuki Iwata (1914 - 2014) who although in his eighties, attended many PAQS Congresses during the very early days of the association. He attended a few congresses well into his nineties. During the 13th PAQS Kuala Lumpur congress in 2009, he gave a televised congratulatory message to the 2009 PAQS-Iwata Foundation essay winner.

