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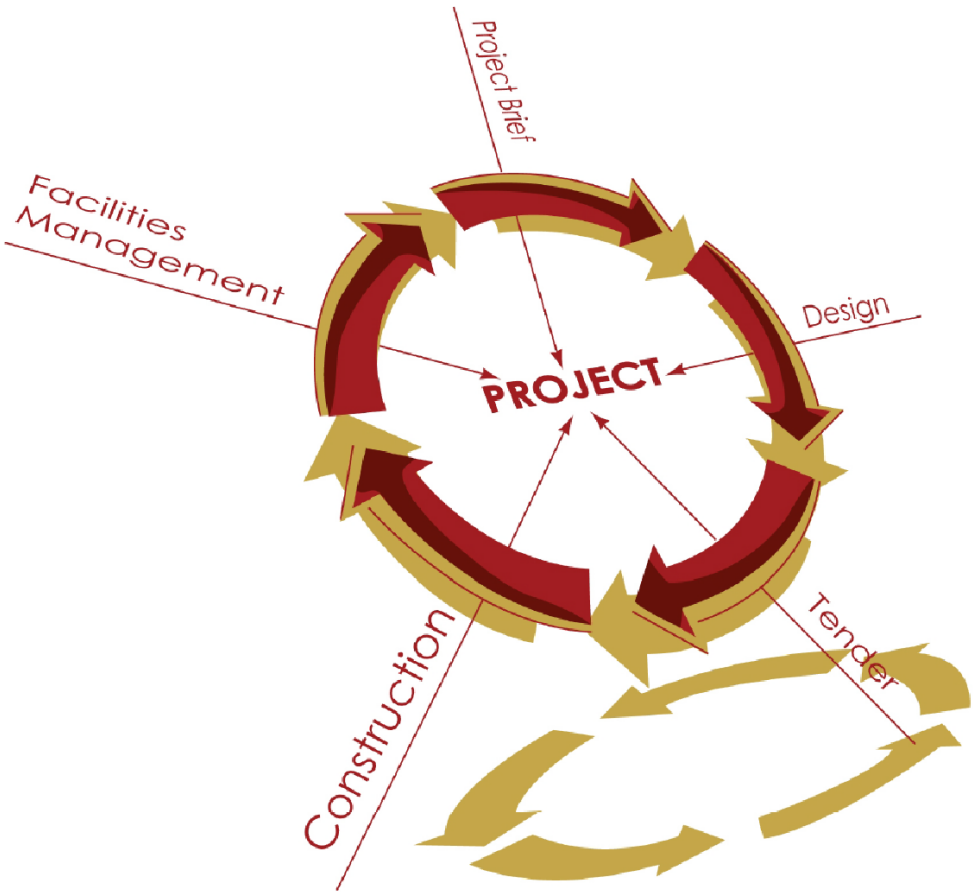

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Contents

Introduction

Welcome to the Special Issue of the Malaysian Construction Research Journal (MCRJ) in conjunction with the 4th International Conference on Research Methodology in Built Environment and Engineering (ICRMBEE 2019). This conference was organised by Universiti Teknologi MARA (UiTM) with co-host by Environmental Development and Sustainability (EDS), Chulalongkorn University, Thailand. The conference was held on 24 - 25th April 2019 in Bangkok, Thailand. This biannual event aims to be a premier platform for researchers and practitioners to present and discuss the most recent innovations, trends and challenges encountered as well as solutions adopted. The central theme of the conference 'Synergising the Impacts of Globalization on the Built Environment and Engineering Research' is intended to spur new ideas for a technologically advanced sustainable construction industry.

This Special Issue of Malaysian Construction Research Journal (MCRJ) presents extended articles which have been chosen from among the selected papers in ICRMBEE2019. A total of 20 papers from various backgrounds in the built environment and engineering discipline which the main focus is on the aspect of research methodology.

Accepted papers covered eight categories under built environment and engineering includes sustainable construction and built environment, project management, property management, facilities management, procurement and contract, architecture, quantity surveying and park and amenities management. Each paper that was presented and published in this conference had undergone a rigorous review process by independent expert reviewers who are knowledgeable in the pertinent subject area.

The theme 'Synergising the Impacts of Globalization on the Built Environment and Engineering Research' creates an opportunity for interaction and exchange of ideas in technological advances and building bridges among researchers across universities, research institutions, government and industry experts.

Editorial Advisory Board

Secretariat Special Issue

Editorial

Welcome from the Editors.

Welcome to this special issue in Malaysian Construction Research Journal (MCRJ) for the International Conference in Research Methodology on Built Environment and Engineering 2019 (ICRMBEE2019). We would like to express our sincere gratitude to our contributing authors, reviewers, organisers and readers.

This special issue in MCRJ for ICRMBEE2109 contains twenty (20) interesting papers covering the theme of "Synergising the Impacts of Globalization on the Built Environment and Engineering Research'. It is hoped that the readers would greatly benefit from the scientific content and quality of papers published in this issue. Brief introduction of each article is given as hereunder:

Osunsanmi et al., have presented a study on the customers' satisfaction towards hotels' facility management in Lagos State. The study examines the impacts of the Facility Management (FM) practice for guaranteeing hotel customers' satisfaction by adopting a closed-ended questionnaire survey. The study concludes that an increase in FM practice will further enhance customer satisfaction, considering the major drivers of hotel customer satisfaction of the hotel's physical setting, location, and policy. The research recommended that the facility management department should be allowed to design policies that encourage hotel customer participation. For a new hotel development, adequate consideration should be taken to the location and the physical settings of the hotel.

Adnan et al., have discussed on the application of Delphi technique to validate findings from administered questionnaire surveys and in-depth interviews regarding the successful implementation of joint venture (JV) projects in Malaysia. The study using the Delphi technique was aimed to achieve consensus of opinions amongst the selected expert panellists in evaluating the critical success factors (CSFs) towards operating effective and efficient JV projects in Malaysia. Prior applying the Delphi technique, twenty-one (21) critical factors associated with successful construction of joint venture projects have been identified through a comprehensive literature review. The factors were then structured in a questionnaire survey, distributed amongst 1630 Chief Officers (Malaysian) and 70 foreign contractors working with JV companies. In-depth interviews with selected experienced professional were later carried out to confirm the responses obtained from the survey results. Finally, as to verify the JV CSFs studied, the Delphi technique was adopted to triangulate both results from the survey and interviews to establish more robust findings. The Delphi technique was run several rounds until consensus was achieved on 7 CSFs, which include inter-partner trust, criteria for partner selection, mutual understanding, and agreement of contract, compatibility of objective and management control.

Ismail et al., paper introduces contractual behaviours in road construction projects. It highlights the common contractual behaviours of key participants in Malaysian road projects and how they lead to unsatisfactory performance by measuring the relationship of the contractual behaviours and road projects performance. The outcome of this paper is important to be put more concern by the government in the attempt observe the performance of road projects in Malaysia.

Wahab et al., highlighted factors that influencing the transformation strategies in facilities management (FM) towards business globalization of an organization. In this study Organisational Behaviour (OB) has been adapted to look into improvement of the FM roles in the need for greater understanding in supporting business organization. Transformation strategies is a change within organizations, teams and individuals that focus on future needs. The Structural Equation Modelling (SEM) was produced from the feedback given by the respondents to foresee the collaborative strategy between FM and OB for business success. SEM used as a tool to enhance research and improve integration within management level for better performance.

Adnan and Baharum examined a framework for healthy construction workplace due to the fact that construction workers are exposed to various health hazards throughout the construction process. Generally, this paper embraced fully literature review from previous study as a development to the theoretical framework. The author explained an overview of healthy construction workplace which includes definition and concept. After synthesizing and evaluating the finding highlighted three main criteria of healthy construction works place. Such criteria are healthy practice, physical work environment and organizational culture set off to promote healthy workplace in Malaysia construction.

Yusop et al., have aimed a framework establishment through a study on the predictors of the spatial visualization ability (SVA) achievement scores and the quantification course achievement amongst Malaysian public university students in Quantity Surveying Programme. As an initial study, the findings describe the potential criteria and variables to measure the effects of SVA on the quantification course achievements in predicting the performance effects. Essentially, the results would potentially lead towards the formation of an effective and valuable teaching and learning adaptation framework. The potential framework could be integrated into the existing planning and decision-making process of teaching and learning in the education programme to improve the current educational practices.

Kipli et al., have examined research strategies for knowledge management adapted in Private Finance Initiative (PFI) projects in Malaysia. The results from the analytical review of literature showed that the quantitative method is the least method employed by the past researchers in their study related to the PFI projects. Implying that the quantitative method has the advantages of directing the research finding using hypotheses with statistical data analysis, it is suggested that the next research to adopt this method, possibly using questionnaire to survey the knowledge management implementation in PFI projects.

Mohd Ali et al., have investigated the integration of waqf real estate and zakat in the perspective of Fiqh Muwazanat in assisting State Islamic Religious Councils (SIRC) top management towards decision making in the developments of projects. The establishment of the framework is the combination of various disciplines according to the needs of the study in which 19 variables have been recognized as the factors that integrate waqf and zakat process. The findings of the study on the integration of waqf and zakat are significant in strengthening asnaf comprehensively from the viewpoint of Fiqh Muwazanat. When the informants respond to the questions related to the pattern of conceptual framework established, it reflects the substantive theory from the analytic induction of the strategic management. It contributes towards the significance of the concept of Fiqh Muwazanat

performed according to Shariah principles and fatwa before they can proceed with the projects.

Baharuddin et al., have investigated the influence of BIM training on attitudes to BIM implementation amongst project stakeholders in the Malaysian Public Works Department (PWD), following the low level of BIM utilisation amongst Malaysian construction players. This study adopted the extended technology acceptance model (TAM) in which the beliefs of ease of use (EOU), usefulness (U) and employee resources (ER) were utilised as TAM variables. Three hypotheses were developed in testing the relationships between training variables and behavioural intention to use (ITU). The data for the study was collected through online questionnaire survey amongst professional employees of government agencies in Malaysia. The questions asked were concerning the awareness, participation and perspectives of the respondents on BIM training and attitudes towards BIM adoption. From 204 responses received via the survey, the results showed that TAM variables (EOU, U and ER) have significant positive relationships with the behavioural ITU, which accorded with most of the previous research findings. This study is significant in promoting BIM and raising awareness of BIM benefits through trainings particularly in beliefs of usefulness, ease of use and resources of the project stakeholders.

Fauzi et al., have determined the concepts of corporate real estate (CRE) from the perspectives of the Malaysian practitioners. From the investigation, the study has established comprehensive reviews on the definitions of CRE. It captures a dynamic response on the CRE interpretations by Malaysian experts including the determination of CRE on government properties as well as developers' properties.

Aris et al., have studied on the Shariah Compliance by clothing retailers or boutique owners in addressing the needs of their female Muslim customers when they shop at the boutiques or retail stores. The Quran and Sunnah through reviewed literature, have outlined three main principles which are privacy, modesty and hospitality to be specifically abided for interior design and interior architecture when designing retail stores. Interview results revealed that selected retails comply with only a few of the Shariah compliance elements and characteristics. However, those could not be considered as true Shariah compliant retails, as some of those criteria provided were unable to fully match the proposed list of Shariah compliant requirements.

Dahlan et al., examines the critical success factors (CSFs) for quality Facilities Management (FM) in managing apartments in Malaysia by initially identifying the critical considerations. It highlights the critical success factors (CSFs) for quality Facilities Management (FM) in managing apartments in the perspective of owners' frontline representatives from various apartments' official managing bodies in Selangor, Malaysia. The outcome of this paper would potentially be developed as key performance indicators (KPIs) for quality facilities management (FM) in apartments, specifically in the local region.

Aziz et al., have discussed the issues on public rental housing choices pertaining residents' satisfaction that are determined by the factors of dwelling unit features, dwelling unit support service, public facilities, social environment and neighbourhood facilities. The survey results showed that among five determinants of public rental housing choices, the number of bedrooms, garbage collection services and cleanliness of corridor, the availability

of prayer hall and road perimeter, security, close proximity to religious building and workplace were ranked as extremely satisfied by the occupants. Whilst, the size of living area, dining area and kitchen, ventilation of the apartment unit and laundry area, cleanliness of drain and lighting, the availability of food stall and local shop, crime and noise, long distant to the nearest fire station and hospital were ranked as least satisfied by the occupants. This study is significant in accommodating households' determinants for public rental housing choices, in which could assist in household decision making.

Safiee et al., identify the conceptual competencies framework for the physical asset of a higher education institution. The findings revealed that from various main professional institutions, competencies essential for the profession are business support services management, sustainability as well as finance and IT. The author found that the constraints available require additional competencies to fill in the gap, namely current government policies and strategic management, technology-related tools, business strategy and asset strategy as well as multi-tasking skills.

Kamil et al., investigated on inequality of bargaining power in the standard form of contract in Malaysia. The study focuses on an investigation of inequality bargaining power that exist in the standard forms of contract in Malaysia particularly the PAM 2006 and PWD 203A 2010 contracts. Duty of the employer and the contractor were investigated in respect of time and procedure as the parameter of this investigation by adopting a document analysis on both contracts. Then the researcher used thematic content analysis as the tools of the research to establish the result. The finding shows that inequality in bargaining power exists in both contracts. The research can be concluded that the bargaining power in the existing form of contract still exist even though it might be minor, but practically, the contract still can be used without any doubt.

Ahmad Rashid et al., looks at possible professional negligence liability in relation to professional designers' scope of works in Malaysia. Several areas of works related to professional designers, exposed to professional negligence if not properly managed were identified. It is crucial for professional designers to fully understand the risks. Positive steps and measures must be taken by professional designers and other stakeholders to manage such risks.

Mahadzir and Marhani, explore the usage of social media on lean construction (LC) concept in the Malaysian construction industry in the perspective of the public and the level of the different type of social media platform usage. As the social media plays a vital role in exchanging information between the parties that includes client, consultants, contractor, user and the public, the researcher also present the barriers appeared in the usage of the social media as well as the ways to improve the usage of social media in construction industry based on the public perspective. The findings identify three (3) main barriers that appear from the use of social media on construction industry and suggest three (3) main improvements to overcome the barriers. The said barriers and improvements cover the level of knowledge, connectivity/access restriction and reliability of social media.

Hashim and Shaidin, discuss the relationship between Quality of Work Life (QWL) and Job Satisfaction among employees of a project management consultancy in Malaysia. QWL and Job Satisfaction has been among the extensive subject of research for decades and

significant progress in line with academic and industrial perspectives of the subject has been attained over this period. However, very limited study has been made regarding this subject for project management consultancies. The result shows that the respondents evaluated QWL in the organization and the level of job satisfaction as moderate. Pearson correlation analysis was used to test the relationship between the two variables. Overall, there was a significant relationship between QWL programme and job satisfaction. The authors also highlighted several subjectivity and limitations in studying the QWL and Job Satisfaction which offers some insights for future research.

Ismail et al., have described the delay aspects of contractors' work progress based on contractual behaviour in civil engineering projects. Initially, twenty-seven factors from four domains namely project characteristics, the quality of Standard Form of Contract (SFoC), external factors and attitudes of project key participants that contributing to delay were assessed through a questionnaire survey. From 288 responses gathered, it was found that resources availability, project scope changes, ground uncertainty, surrounding uncertainty and competency of contractor are the five significant factors that contribute to delay of contractor's work progress. Semi-structured interviews were then conducted to gather opinion on initiatives to be taken to overcome delay of contractor's work progress in civil engineering construction projects. The initiatives recommended to be taken by contractor were to closely monitor of day to day site progress, closely monitor the subcontractors' works, exercise good site coordination and supervision, exercise efficient management of project cash flow, and allocate a contingency budget and proactive liaison with public agencies. Whilst the initiatives recommended to be taken by engineer were fulltime inspection by resident engineer (RE), timely produce the revised drawing, joint assessment prior to the acceptance of contractor proposed work program.

Bakhary et al., investigating problems related to construction claims experienced by Malaysian contractors in construction projects. The finding indicates that inaccessibility or unavailability of relevant documents, the lack of site staff's awareness to proactively detect claims and understand the contract itself, and conflicts arising during owner/contractor negotiation are all critical problems associated with the process of claim management.

IMPACT OF FACILITY MANAGEMENT PRACTICE ON HOTEL CUSTOMERS' SATISFACTION

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Abstract
Hotels function as the backbone for the hospitality sector in Africa and it contributes to the GDP of the continent. Unfortunately, the hotels in most developing countries have not been able to compete effectively with their international counterpart due to numerous reasons with the major been poor customer satisfaction. Therefore, this study examines the impact of facility management practice for guaranteeing hotel customer satisfaction. The study proposed that facility management should be broken down into hard, soft and beneficiary participation. The study adopts a random sampling technique in collecting data from 2 categories of respondents, i.e. 6 facility managers and 85 hotel users from selected hotels in Lagos State respectively. Data analysis was executed using descriptive statistics, principal component analysis and regression estimates with the aid of SPSS V 23. The result reveals that there is an impact of facility management practice on the satisfaction derived by hotels users which confirms that facility management as a style of asset management guarantees customer satisfaction. Also, the location of the hotel, hotel policies and the physical settings of the hotel are the major factors that determine customer satisfaction. The research recommends that hotel stakeholders should improve their facility management department. The study contributes towards improving the Nigerian hospitality sector and proving a road map.

Keywords: *Beneficiary participation; customer satisfaction; facility management; hotel management; user's satisfaction*.

INTRODUCTION

Rao and Sahu (2013) avowed that the hospitality industry is a variety of business aimed at providing services related to customer, leisure, safety and satisfaction. Arohunsoro et al. (2020) the hospitality industry is defined as the people business focused on providing physical and psychological comfort for its customers in place of a reward. Similarly, Okoroh et al. (2002) submitted that the hospitality industry is a group of business that is concerned about satisfying their customers through effective management of their resources. Chen (2015) affirmed that the hospitality industry is a section of the service industry with numerous groups or segments focused on customer leisure. The segment includes food and beverage, tourism, recreation and lodging (hotel). Amongst all the segments of the hospitality industry the hotel is the most significant due to the significant contribution to the hospitality industry.

Okoroh et al. (2002) and Ahmad and Adaoglu (2019) avowed that hotels which are part of the hospitality industry in the United Kingdom contribute towards reducing unemployment in the country. Likewise, Berahman (2013) discovered that in Dubai hotels function as the pillar of the hospitality sector and is responsible for employing numerous foreign nationals thereby contributing to the GDP. Unfortunately, in Nigeria and some other African countries, hotels have not been able to significantly contribute to the countries employment directly and indirectly (Adeola and Ezenwafor, 2016). Similarly, Durodola et al. (2011) affirmed that the hospitality industry in Nigeria which is made up of hotels contributes poorly to the GDP of the country. The situation implies that hotels in Africa are not performing at the same level in comparison to developed countries.

Numerous reasons could be responsible for the inferior performance of African and Nigerian hotels in comparison to developed nations. Adeola and Ezenwafor (2016) discovered that the operating environment of the hospitality sector in Africa is responsible for the deficient performance of hotels in Nigeria. Udegbe (2017) discovered that poor investment and support from the Government in the hotel business is responsible for their low performance. Durodola et al. (2011) stipulated that the poor asset management styles adopted in Nigerian hotels are responsible for the poor performance of hotels in Nigeria. Amue et al. (2013) discovered that the physical settings and aesthetics of the hotels within the country further reduce their effectiveness in Africa and Nigerian. It can be deduced from the aforementioned that hotels in Nigeria is confronted with diverse challenges.

Towards overcoming the challenges confronting hotels in Nigeria and other African countries several studies have been conducted. Durodola et al. (2011) evaluated the property asset management styles in hotels within Nigeria intending to understand the contribution of management principles on hotels. Agbim and Idris (2015) studied knowledge dissemination within hotels in Nigeria with a focus on understanding the role of leadership in hotels. Oluseyi et al. (2016) examined the energy consumption and carbon footprint in Nigerian hotels with the agenda of understanding the ambient condition in hotels. Banki et al. (2016), Nwokorie (2016) and Peace and Onuoha (2017) examined the service quality of hotels in Nigeria with the agenda of improving the service in Nigerian hotels. Udegbe (2017) estimated the impact of market orientation on the performance of Hotels in Nigeria with the agenda of understanding the market dimensions of Hotels. Nwokorie and Igbojekwe (2020) appraised the security challenges of hotels in Nigeria to reveal the relationship between security and hotel performance. The findings from these studies contributed to improving the hotels in Nigeria.

However, the studies failed to assess the role of customer satisfaction as a significant construct for ensuring hotel performance. The review of the literature shows that customer satisfaction is a significant factor in determining hotel performance. Also, Abomeh (2013) confirms that hotel customers are regarded as kings because they are the reasons why the organisation exists and they determine the future of the hotels. Therefore, their needs must be identified and provided for, appropriately backed up with the necessary incentive, stimulus, drive and motivation. The more satisfied the customers are, the more likely they are to maintain their loyalty to the hotels (Chu and Choi, 2000). It can be inferred that customer loyalty can also be related to customer satisfaction. Likewise, Nwokorie and Igbojekwe (2020) and Nwokorie (2016) perceived that customer satisfaction is tantamount to customer loyalty. Mazumder and Hasan (2014) and Houston et al. (2018) asserted that customer satisfaction is a function of the quality of the hotel services. However, this study identified that hotel customer satisfaction encompasses the above definition including the ability of the hotel management in ensuring that the customer expectation meets their perception. This study proposed that the management style or strategy put in place has a significant impact on customer satisfaction of hotels.

The management style proposed in this study is facility management (FM) which is described as the practice of coordinating the physical workplace with the people and work of the organisation (Lavy, 2008). It can be implied that FM serves as a support for the major function performed by people in an organisation to improve its services and improve its competitive advantage. This function of FM makes it suitable for application in hotels which

is denoted as a people industry because of its focus on providing people with shelter, food and others. Based on the unique phenomenon of FM this study proposed that it will have a significant impact on customer satisfaction in hotels. Also, the application of FM principles in the hospitality sector as shown by previous studies further justifies the implementation of FM in this study. For instance, Penny (2007) and Talib et al. (2019) examined the role of FM for ensuring sustainability within the hotel with a focus on the environment. Priyangika et al. (2019) appraised the role of facility management in the hotel industry with a focus on skills, competence and advantage. Majority of the studies relating to facility management and hotel industry together were conducted in developed countries thereby leaving a gap in developing countries like Nigeria. Also, these studies did not examine the impact of facility management on customer satisfaction. The purpose of this study was to examine the impact of facility management principles on hotel customer satisfaction. This study also contributed to filling the gap as it introduced the concept of beneficiary participation for facility management.

HOTEL MANAGEMENT IN THE NIGERIAN HOSPITALITY INDUSTRY

The hospitality industry is very broad as it includes food and beverages, tourism, recreation and hotels (Amue et al., 2013; Udegbe, 2017; Talib et al., 2019). Amongst all the segment of the hospitality sector, the hotel's industry contributes significantly to the growth of the hospitality sector (Durodola et al., 2011; Talib et al., 2019). Nwokorie and Igbojekwe (2020) avowed that the hotel industry in Nigeria is one of the rapid growing sectors of the Nigerian economy due to the involvement of private investors. Likewise, Amue et al. (2013) affirmed that private individuals and foreigners are the major drivers for hotel growth in Nigeria. It can be deduced that the Nigerian Government have little investment or presence in the hotel industry.

Nwokorie and Igbojekwe (2020) affirmed that the insecurity confronting most hostel in Nigeria could be attributed to the little Government presence in the hotel industry. The scholar explained further that the security confronting hotel industry ranges from cybersecurity, internal security and environmental security. Towards protecting their customers and properties most hotels in Nigeria resort to private security companies. Nwokorie (2016) avowed that the private security firms provide efficient security for the hotels but are expensive therefore forcing an increase in hotel cost of services and products. The increase in hotel cost of services further affects customer loyalty and satisfaction (Banki et al., 2016; Chen, 2015). The desire to increase customer loyalty and satisfaction within the Nigerian hotel has led to numerous researches into the hotel industry as shown in Table 1.

Table 1 presents a summary of publications related to the hotel industry in Nigeria. The publications were extracted from the Scopus database using keywords like Hotel in Nigeria" "Hotel patronage in Nigeria" and many others. The publications with major citations from 2010 to 2020 were selected. The recent publications were selected to understand the present trends in the hotel business and the publications are presented in Table 1. The table shows that the majority of the research in Nigeria is centred on customer patronage, service delivery and customer loyalty and security. The findings from the review of the literature show that hotel customer satisfaction is measured in the past based on loyalty, service delivery, physical settings of the hotels, service recovery strategies, security and E-marketing. Also, ensuring customer satisfaction is the most paramount factor in the hotel and is sometimes known as customer loyalty or patronage.

Table 1. Summary of publications related to the hotel industry in Nigeria

Author	Topic	Findings/research focus
Durodola et al. (2011)	*"Impact of Property Assets' Management Styles on Effective Service Delivery in South-Western Nigerian Hotels".*	The study focused on assessing the effect of assert management adopted in hotels on service deliveries within the hotels. It discovered that maintenance management is the predominant form of asset management styles and it has an impact on service delivery in hotels.
Amue et al. (2013)	*"Physical Settings and Patronage of Three Star Hotels in Nigeria's Federal Capital Territory Abuja".*	The article focusses on hotel customer physiological, cognitive and emotional behaviour. It discovered that the physical settings of hotels affect their patronage.
Adesina and Chinonso (2015)	*"Service delivery and customer satisfaction hospitality industry: a study of the divine fountain hotels limited Nigeria".*	The focus of the study was centred on assessing the relationship between service delivery and customer satisfaction. It discovered that service delivery and customer satisfaction are significantly related and can sufficiently predict the growth of a hotel.
Nwokorie (2016)	*"Service recovery strategies and customer loyalty in selected hotels in Lagos State, Nigeria".*	The study focused on the impact of service recovery on customer loyalty. The hotels in Nigeria majorly adopts compensation as a service recovery strategy and it has a positive impact on customer loyalty.
Banki et al. (2016)	*"Measuring hotel service quality in Nigeria: A case study of Minna township".*	The study focused on assessing the quality of services provided to customers of hotels in Minna. It examined the relationship between service quality, customer perceived value and satisfaction. A structural equation modelling was used and it discovered that there is a significant impact of service quality on customer satisfaction.
Peace and Onuoha (2017)	*"Service Blueprint and Customer Post-Purchase Behaviour of Hotels in Nigeria*."	The study focuses on examining hotel customer post-purchase behaviour using their service blueprint. It discovered that service blueprint has a positive relationship with hotel customer behaviour.
Nwokorie and Igbojekwe (2020)	*"Security Challenges for the Hotel Industry: Implications for Selected Hotels in Owerri, Nigeria."*	The focus of the study was on guest loyalty and security challenges in the hotel. It discovered that there is a positive correlation between hotel security and guest loyalty. The security challenge among hotels in Nigeria includes poor collaboration among hotel and inadequate emergency exists.
Arohunsoro et al. (2020)	*"Evaluation of the influence of E-marketing on patronage behaviour and its attendant challenges: a case study of selected hotels in Ado-Ekiti Nigeria."*	This research focused on assessing the impact of E-marketing on the patronage behaviour of hotel. It discovered that E-marketing assists in saving time and ensuring the patronage level. The major challenges associated with E-patronage includes no central payment method, poor information structure, weak marketing and power supply.

Source: Authors review of literature

Abomeh (2013) affirmed that ensuring customers satisfaction is the most paramount factor because hotel customer is regarded as kings, as they are the reason for establishing the hotels and they determine the future of the hotels. This implies that their needs must be identified and provided for, appropriately backed up with the necessary incentive, stimulus, drive and motivation. Durodola et al. (2011) asserted that another vital personality in the hotel organisation is the hotel General Manager who serves as the link between the Board of Directors, the operational staff and the customers they are supposed to serve. He is also responsible for interpreting and implementing the policy objectives and helping as the

behavioural role management for the entire management team. Rao and Sahu (2013) opined that the general manager is the head of the establishment who occupies the driver's seat and sees the horizon. Paraskevas (2001) is of the view that apart from being the head of the organisation, the general manager is responsible for useful hotel accommodation packages to satisfy the customer. It is evident that even though the general manager can be seen as the captain of an organisation, he cannot achieve all the goals and objectives of the organisation without the assistance of other departments including the customer or guest which is the main reason why a typical hotel organisation exists.

It can also be deduced that managers are responsible for much of the success or failure of an organisation. Even though he/she is referred to as the alpha and omega of the hotel business, he cannot perform or achieve success without the customers because they are the key factors that determine hotel profitability and the mission of a good manager is to ensure that the guest leaves satisfied and wanting to return. Unfortunately, Table 1 shows that there is little or no research that has focused on the impact of facility management on customer satisfaction in Nigerian hotels.

Facility Management and Beneficiary Participation

Facility Management (FM) is the practice of coordinating the physical workplace with the people and work of the organisation (Lavy, 2008; Ani and Ali, 2019). Thus, FM entails the provision of total work environment which includes buildings, office equipment and services. Barrett and Baldry (2009) stated that facilities management is a process that ensures structures and technical systems support the operations of an organisation. Hassanien and Losekoot (2002) provide a more pragmatic definition of facility management which is the process of identifying requirements, designing (physical or services), documenting, resourcing, providing the physical facilities or delivering of intangible facilities and monitoring the provision or delivery processes. Chen (2015) also defines facility management as the glue that holds organisations together, thereby enabling it to provide its output seamlessly.

Olomolaiye et al. (2004), avowed that FM is divided into two parts, they are hard and soft FM. The components for the hard and soft components are presented in Table 2. Hard FM entails management and maintenance of property which includes the infrastructure facilities. Whereas the soft FM deals with the management of the support services such as waste management, cleaning and catering and other essentials facilities that are required for the users of the property. Thus, this study relates the beneficiary participation as the soft FM part and it defines beneficiary participation as the degree of involving hotel customers on the design, maintenance and usage of the soft component of FM. It is expected that if the hotel users are involved with the designing and the decision regarding the soft component of the building there is a high possibility for meeting the expectation of the customers.

Table 2 shows the components supporting facility management practice and this study proposed the addition of beneficiary participation to the soft practice. The concept of beneficiary participation has been used in several studies and industries. Aigbavboa and Thwala (2018) adopted the concept of beneficiary participation in modelling housing satisfaction. Netshipale et al. (2017) introduced the concept of beneficiary participation in studying land reform in South Africa. Mercelis et al. (2016) adopted beneficiary participation

for Government developmental project in Vietnam. The finding from all the studies revealed that beneficiary participation is a major driver in ensuring the satisfaction of a developmental project as it provides the project user to contribute to the design. Unfortunately, in the hospitality industry, there is little or no research that focuses on the adoption of beneficiary satisfaction for hotel customers satisfaction.

Table 2. Facility management principles

	Reviewed Authors					
	(Barrett and Baldry, 2009)	(Olomolaiye et al., 2004)	(Okoroh et al., 2002)	(Ani and Ali, 2019)	(Atkin and Brooks, 2015)	(Jones, 2000)
Hard practice						
Ground and environment maintenance	X	X		X	X	X
Renovation management		X			X	
Building and facility condition assessment	X		X			
Operating cost control management					X	X
Risk management		X			X	
Property management		X		X	X	
Financial management					X	
Soft practice						
Delivery contract management	X					X
Hotel supply purchase	X			X		
Waste management					X	
Space planning			X			
Environmental management		X				
Logistics management		X			X	
Human resource management			X			
Resources management		X				X

Source: Authors review of literature

However, a similar concept has been adopted in the hospitality sector known as the guest comments cards. Holjevac et al. (2009) suggest that it entails asking what the customer prefers by preparing a questionnaire which is distributed in hotel rooms, at the reception desk or in some other visible places. In this manner, guests can indicate whether the service was above or below their expectations and whether they considered a service essential or not. The major difference between this concept and beneficiary participation is that it seeks the hotel customers opinion after the facility or services has been rendered. However, beneficiary participation proposed that the hotel customers should be involved during the design of the services to ensure that their expectation meets reality that in return guarantees satisfaction.

Hotel Customer Satisfaction

The term customer satisfaction has been used extensively in the marketing domain to determine how a product or service meets or surpass customer expectation (Bamidele et al., 2018). Adesina and Chinonso (2015) defined customer satisfaction as the degree to which the experience reported by a group of customers exceeds their expected satisfaction. This implies that satisfaction is the ability of a service or product to meet the threshold of a certain

expectation. It can also be deduced that satisfaction is a subjective term depending on another phenomenon. This study recognizes satisfaction as the degree which a hotel services meet the expectation of a hotel user based on the facility management principles set in place.

This study of customer satisfaction was created after recognising that for a hotel to reach its highest efficiency, attain its aims and objectives, satisfy its clients or customers its facility management department must be efficient. Karunaratne and Jayawardena (2010) opined that satisfying hotel customers are a tedious task as they seek a set of needs and want related to the services being provided by the hotels. Servqual has been used by various authors to measure customer satisfaction. Rao and Sahu (2013) define Servqual as the process of gauging customer expectation with the quality of service provided by the hotels. This implies that customer satisfaction is equal to perception minus expectation, this has been denoted in a mathematical equation as $S = P - E$ (Mazumder and Hasan, 2014) where p stands for perception, S for satisfaction and E represent expectation.

Authors such as Rauch et al. (2015) and Kargari (2018) used servqual to measure customer satisfaction in hotels and discovered that the overall service quality in the hotel industry in China fell below expectation. On the other hand, Kandampully and Suhartanto (2000) identified four factors such as reception, housekeeping, food and beverages, and price as important determinants for measuring customer satisfaction. Devi Juwaheer and Lee Ross (2003) earlier found that an overall evaluation of service quality in Mauritian hotels was mainly determined by factors such as; security and safety of guests and effective handling of complaints and problems by hotel staff, and resolving problems encountered by guests. However there exist a gap in research ensuring the impact of facilities management principles on the impact of hotels in Nigeria

RESEARCH METHOD

The purpose of this study was to examine the impact of facility management principles on hotel customer satisfaction. Towards meeting the objective of the study hotels that are located in Lagos were picked as a case study due to the numerous economic activities within the state that attracts standard hotels (Osunsanmi et al., 2017). Likewise, Nwokorie (2016) and Arohunsoro et al. (2020) affirmed that the western part of the country is home to some of the major hotels in the country, especially Lagos state Nigeria. For instance, Lagos serves as a home to the Eko hotels and suite located on the island which is known for is a large hall and attracting numerous customers all over the world.

The study utilised a random sampling technique in collecting data from the facility managers and hotel users. The study adopted random sampling because of the capacity in creating smaller sample size from a larger population group (Kumar, 2019). Creswell et al. (2007) avowed that random sampling works on the principle of selecting individuals randomly from a larger set of population. The premise behind random sampling makes it suitable for adoption in this study based on the larger number of hotel customers in the selected hotel. The study selects three hotels from different Local Government within Lagos metropolis as shown by the map and was named hotel 1, 2 and 3. The hotels were given pseudo name to protect their identity following the ethical clearance for conducting the research.

A closed-ended questionnaire was used in collecting data from the respondents of the selected hotels. A total of 6 questionnaires was collected and used for the analysis out of 10 that was distributed to the facility managers (hotel managers). This represented a response rate of 60% whereas a total of 85 questionnaires was collected from the hotel users out of 110 that was distributed and having a response rate of 77%. All the questionnaires were collected from the three hotels randomly. The high response rate could be attributed to the manner adopted in distributing the questionnaire and the number of weeks in collecting the response. The study adopted a combination of online distribution and physical distribution using research assistant that took two months and a few weeks in collecting the questionnaire. After the questionnaire was collected it was subjected to a reliability test using Cronbach's Alpha that resulted in a value of 0.856. Tavakol and Dennick (2011), reported that a Cronbach Alpha with a value of above 0.7 is acceptable because it indicated that the questionnaire is reliable and adequately measure what it was designed for.

The questionnaire for the facility managers was broken down into three sections with the first section examining their characteristics, extent of applying facility management practice in the hotel and their understanding of the concept of beneficiary participation. The questionnaire for the hotel customers was broken down into four sections with the first section examining their characteristics and reasons for staying the hotel. The second section appraises their level of satisfaction with the hotel services managed by the facility managers. The third section examines their level of involvement with the hotel decision and the last section seeks their opinion regarding the facility management practice in the hotel. However, only the questions that fit the objective of this research was analysed and reported.

The study adopted a quantitative method of analysis in analysing the questions that fit the objective of the research. The data were analysed using descriptive statistics, regression analysis and principal component analysis (PCA) with the aid of the Statistical Package for Social Science (SPSS), version 23. The PCA is a statistical tool adopted for reducing the dimensions of large data through converting a large set of variables into smaller ones that contain the same information of the large data but in different dimensions (Jolliffe and Cadima, 2016). Thus, PCA was used for the analysing the satisfaction of the hotel customers with the hotel facilities and features. The principal component (PCA) analysis was used because scholars such as Adesina and Chinonso (2015) and Aigbavboa and Thwala (2018) affirmed that users satisfaction is multi-facet involving large data set. Also, the PCA was used to understand the relationship pattern that ensures hotel customer satisfaction. The mean item score was used in understanding the major FM practice that is often adopted in the hotel. While the regression analysis was used in examining the impact of FM principle on hotel customers in the study area. The FM principle was broken down into hard and soft with the soft principle representing the beneficiary participation.

Figure 1. Location map of the hotels

FINDINGS AND DISCUSSION

The result from the field survey of the questionnaire together with the discussion of findings is presented in this section. The section was broken down into three sections with the first examining the extent of application of facility management practice in the hotels. The second section appraises the satisfaction of the hotel customers using principal component analysis. While multiple regression was used in assessing the impact of facility management practice on the hotel customers satisfaction.

Facility Management Practice in Hotel Organization

This section presents the facility management practice that is adopted in the hotel organisation. The facility management practices were extracted from the review of literature such as Okoroh et al. (2002), Olomolaiye et al. (2004) and Ani and Ali (2019). The practices were then presented to the facility managers to rate their applications in the hotel using a five-point Likert scale from 1 denoted as less likely to 5 represented as very likely. The same FM practice was presented to the hotel customers using the same Likert scale to rate their perception regarding the FM practice in the hotel with the outcome presented in Table 3. It can be deduced from Table 3 that the facility managers adopt all the facility management practices in the hotels. Also, there are some differences and a few similarities among the facility manager and hotel customers. The difference could be attributed to the dynamic nature of facility management characterized with a different meaning (Barrett and Baldry, 2009). Despite the difference in opinion of the respondents, there are still some similarities in their response. For instance, the respondents (facility managers and hotel customers) jointly agree that ground and environment maintenance is the major FM practice adopted in the hotel. The discovery from this study coincides with the research of Okoroh et al. (2002) and Ani and Ali (2019). According to Okoroh et al. (2002), maintenance of the environment is the major focus of facility management application in hotels.

Table 3. Facility management principle

	Facility Managers		Hotel Customers'	
	Mean score	**Rank**	**Mean score**	**Rank**
Ground and environment maintenance	4.83	1	4.35	1
Resources management	4.76	2	3.72	6
Waste management	4.71	3	4.10	3
Delivery contract management	4.63	4	3.58	9
Operating cost control management	4.51	5	3.12	12
Property management	4.46	6	3.86	5
Environmental management	4.32	7	3.75	13
Hotel supply purchase	4.21	8	4.23	2
Risk management	4.10	9	3.66	15
Building and facility condition assessment	3.98	10	3.63	8
Renovation management	3.84	11	3.32	11
Space planning	3.76	12	3.70	14
Logistics management	3.54	13	3.72	6
Human resource management	3.45	14	3.42	10
Financial management	3.30	15	3.95	4

Table 3 shows that other significant FM practices from the facility manager's perspective include: resource management, waste management, delivery contract management, operating cost control management, property management and environmental management with a mean score of 4.32 above. Whereas, space planning, logistics management, human resource management, financial management was rated by the respondents as less applied FM practice in hotels. Ani and Ali (2019) also discovered that most organisations often disassociate their financial management from the facility management thereby making it difficult for proper planning of assets. Mari and Poggesi (2014) relate the disassociation of the facility management and financial management to the poor trust of most facility managers.

Satisfaction with Hotel Facilities and Features

The level Satisfaction has been identified as the degree in which the hotel users expectation meets the reality. Adesina and Chinonso (2015) and Aigbavboa and Thwala (2018) discovered that users satisfaction is multi-facet and therefore recommended a multifaced statistics like principal component analysis (PCA). In line with their recommendation, this study adopts PCA using a varimax rotation method to assess the hotel user's satisfaction. Sixteen (16) facilities and features selected from previous studies were analysed using principal component analysis (PCA). The PCA was divided into two stages with the first stage checking the reliability of the data for PCA analysis and the second analysis was used to extract the component that determines the satisfaction of the hotel users. The finding from the first analysis is presented in Table 4 and it shows that Bartlett's test of sphericity is significant at 99% and 95% confidence level. The chi-square gave a value of 1634.763 with a degree of freedom of 685 also the Kaiser Mayer Olin test provided a value of 0.725 which is a higher than 0.5.

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.725
Bartlett's Test of Sphericity:	
Approx. Chi-square	1634.763
Degree of freedom	685
Significant level	0.000

Table 5 presents the rotated component matrix extracted from the PCA and the table shows that the factors determining the satisfaction of hotel customers were divided into three components. The factors have different loadings but the factors with a high loading are often used in naming the components. The first component has bed space, room size and conversation privacy in the hotel room were highly loaded. The analysis shows that the accessibility and security of the environment are the topmost factors in the second component. On the last component discount rate, affordability and service delivery are highly loaded.

Table 5. Rotated Component Matrix

	Component		
	1	**2**	**3**
Bed space	.767		
Conversation privacy in the hotel room	.761		
Room size	.707		
Level of cleanliness	.673		
Conversation privacy in the hotel room	.666		
Number of rooms	.656		
Accessibility		.724	
Security of the environment		.683	
Proximity to the city centre		.666	
Aesthetics of the environment		.643	
Discount rates			.722
Affordability			.665
Service delivery			.662
Staff relationship			.631
Discount rates			.562
Ease of booking			.450

The component is named based on the factors or variables that make up each component, therefore the three components were named as follows; 1) physical setting of the hotel, 2) location of the hotel, 3) hotel policy.

First component: Physical setting of the hotel

The first component contributed a variance of 24.8% and had variables such as bed space, conversation privacy in the hotel room, room size. Level of cleanliness, conversation privacy in the hotel room and the number of rooms. These variables have a strong correlation together with loading between 0.656 to 0.767 and form a component which was named as the physical setting of the hotel due to their emphasis on the arrangement within the hotel. This study revealed that for facility managers to ensure the satisfaction of hotel users they should focus on the arrangement of the furniture's and fittings in the hotel to ensure privacy. According to Amue et al. (2013), the physical setting of a hotel has a great impact on the patronage of the hotel that indirectly affects the hotel users satisfaction. Therefore, hotel stakeholders that are interested in calving a niche in the market should focus on the physical setting in their hotels. The review of Ani and Ali (2019) revealed that the idea of physical setting is related to space optimisation practice of FM. This, therefore, makes the FM practice crucial in ensuring the satisfaction of hotel customers.

Second component: Location of the hotel

The second component yielded a variance value of 16.3% and had factors such as accessibility, the security of the environment, proximity to the city centre and aesthetics of

the environment. These variables have a strong correlation together with loading between 0.643 to 0.724 and form a component which was named as the location of the hotel due to their emphasis on the environment of the hotel. Likewise, Nwokorie and Igbojekwe (2020) discovered that the location of a hotel performs a significant function in improving the security of the occupants that indirectly determine their satisfaction. Chen (2015) affirmed that the location of a hotel performs a crucial role in determining the patronage of a hotel. Therefore, this study recommends that the facility manager should conduct a proper location assessment before erecting a hotel in an environment.

Third component: Hotel policy

The third component provided a variance value of 12.5% containing variables that include discount rates, affordability, service delivery, staff relationship, discount rates and ease of booking. All the variables within these components correlated strongly among each other and have a factor loading between 0.450 and 0.722. The variables together formed a component that was named as hotel policy due to their emphasis on the principles the hotel adopts in conducting their business. The findings from this study coincide with the research conducted by Arohunsoro et al. (2020). The scholar discovered that the hotel policies encouraging E-marketing, booking and discount have a profound impact on the patronage level. Adesina and Chinonso (2015) discovered that a high patronage level of a customer implies that they are satisfied with the services provided in that hotel. Therefore, this study recommends that the facility management team should be involved in designing the policies adopted in hotels.

Impact of Facility Management on Customer Satisfaction

The impact of facility management practice on hotel customer satisfaction was measured in this section using multiple regression analysis. The facility management practice was broken down into hard and soft as stipulated by (Olomolaiye et al., 2004) and also the concept of beneficiary participation was introduced. The practices that made up the hardcore of FM was merged into a dummy variable using the SPSS transform and compute into one variable command. The same function was conducted for the softcore and the findings are presented in Table 6.

Table 6. Regression Analysis of the Effect of Facility Management practice on Customers' Satisfaction

	B	Std. Error	t	p value	Remark
Constant	**2.196**	**0.454**	**4.830**	**0.000**	**Sig.**
Hard practice	0.654	0.1286	2.481	0.016	Sig.
Soft practice	0.2455	0.5476	4.484	0.000	Sig
Beneficiary participation	0.3040	0.6728	4.518	0.000	Sig
Model's Summary					
R = 0.768					
R^2 = 0.590					
Adjusted R^2 = 0.547					

Dependent variable: hotel customer satisfaction

In this case, as reflected in Table 6, facility management practice (hard, soft and beneficiary participation) enters the regression equation as an independent variable while hotel customers level of satisfaction represents the dependent variable. The table shows that the coefficient of the independent variables (hard, soft and beneficiary participation) is significant at 95% level of significance. The regression equation intercept is also significant

at 95%. Both the intercept and the coefficient are positive, respectively indicating the positive effect of FM practice on hotel users' satisfaction. The equation that the model of the effect of FM practice on customer satisfaction is given thus:

SATF = 2.185+0.1286Hardpractice+0.2455Softpractice+0.3040Beneficiaryparticipation+Є

The regression model shows that all facility management practice has a positive impact on hotel customers satisfaction. It can be deduced from the regression analysis that an increase in the FM practice will further improve the hotel customers satisfaction.

CONCLUSION AND RECOMMENDATION

Hotels contribute significantly to the hospitality sector of the country through the provision of accommodation, feeding and other services for the sector. Unfortunately, the hotels cannot contribute to the hospitality industry without the frequent patronage of customers. This is because customers are regarded as the king of the establishment as they are the reason for establishing the hotels. Thus, ensuring satisfaction is crucial for customer patronage, loyalty and hotel performance. Towards guarantee hostel customer satisfaction this study contributes to existing research by proposing the application of FM practice in hotels to improve the hotel customers satisfaction.

The findings from this study contribute to the practice of FM in the hospitality industry as it introduces the concept of beneficiary participation in determining hotel customer satisfaction. The idea beneficiary participation entails that the hotel customers should be involved during the design of the services to ensure that their expectation meets reality that in return guarantees satisfaction. The study used regression analysis in testing the impact of FM practice on customer satisfaction. The FM practice was broken down into hard, soft and beneficiary participation. The study concludes that there is a positive impact of FM practice on customer satisfaction in hotels and an increase in FM practice will further enhance customer satisfaction. Also, the major drivers of hotel customer satisfaction are the physical setting of the hotel, the location of the hotel and hotel policy.

Based on the conclusion the study, therefore, recommends that to efficiently improve the hotel customer satisfaction hotel stakeholders should improve their facility management department. Also, the facility management department should be allowed to design policies that encourage hotel customer participation. The study also recommends that for new hotel development adequate consideration should be taken to the location of the hotel and the physical settings. The study was limited to hotels located in Lagos state, but the findings of the study apply to hotel management in other developing countries as the state has a mix of 3, 4 and 5 stars. Also, the measurement of the hotel customer satisfaction was limited to the facilities and fixtures of the hotel. Therefore, the study suggests that further study should be conducted examining other parameters that can determine hotel customer satisfaction. Also, further study can be conducted in other African countries.

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ASSESSMENT THE FACTOR OF SUCCESSFUL JOINT VENTURE PROJECTS IN MALAYSIA USING THE DELPHI TECHNIQUES

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Abstract
Careful analysis of the economic, political, social and the cultural environment within which the venture will be implemented and managed must assess the feasibility and the desirability of a JV. A planned approach to JV necessitates a thorough and careful evaluation of these aspects by both partners to ensure successful implementation. This paper discusses the application of the Delphi technique to validate the findings from administered questionnaire surveys and in-depth interviews into joint venture projects in Malaysia. A rationale for the use of Delphi is given, its benefits and limitations and recommendation for its use are provided. The main crucial to joint venture success was identified from literature review identified twenty-one factors as critical to the success of the joint venture projects. Questionnaires survey and forty-three in-depth interviews were taken place in order to get the detail information given by the contractors. The Delphi panel confirmed that inter-partner trust, mutual understanding, criteria for partner selection, agreement of contract, compatibility of objectives, conflict and commitment were the critical success factors and fourteen factors were also identified as Failure Reduction Criteria. It is hope that the findings will be useful to support the successful application of joint venture projects.

Keywords: *Delphi Techniques; Joint Venture Projects; Malaysia.*

INTRODUCTION

The implementation of joint ventures offers economic and other benefits that entail significant costs. However, these ventures are difficult to manage because of the complex processes involved and the shared decision-making develops fragile relationship (Amankwah-Amoah & Durugbo, 2016). The management of joint venture is a demanding task in terms of effort and time because of variety of behavioural, administrative, and cultural impediments. A joint venture is a procedure used to handle specific phenomena such as access to new market, competition, government policy, or economic of scale. Careful analysis of the economic, political, social and the cultural environment within which the venture will be implemented and managed must assess the feasibility and the desirability of a JV.

The liberalisation of policies along with foreign participation in several sectors was announced in March 1988 by the Malaysian government. The foreign participation of Malaysian sectors included privatized infrastructure projects. Moreover, the Malaysian government supports and encourages local contractors in Malaysia to participate in regional as well as global markets (Fong, 2005). These markets are based on the experience and expertise of infrastructure projects, including construction of buildings, power generation, ports, highways, and airports.

Changes in regulation in Malaysia allow Bumiputera Contractor Class 'A' to qualify in construction projects are as the growth in international cooperative behaviour between companies. From the year 1990's the participation of foreign contractors in Malaysia construction projects has been increasing. In Malaysia, Bumiputera Contractors are interested in doing venture because of the political stability, economic growth, and relatively low cost of labour and other resources. This provides an opportunity to foreign firms through joint ventures projects with Malaysian firm as well as Bumiputera Contractors**.** The government for Malaysia is encouraging and supporting local contractors to participate in regional and global market based on their expertise and experiences of construction of building, infrastructure projects, highways, power generation, port and airport coast.

Foreign contractors have been operating in Malaysia long before the signing of the GATS accord in January 1995. At that time, foreign firms were admitted, mostly in a non-discriminate manner, where there were no rigid trade related sanctions on their 100% foreign owned firms that were allowed to operate Malaysia's domestic market. Currently the implementation of its commitment under GATS, market access restriction promulgated by Malaysian regulators have opened opportunities to foreign firms to operate through joint venture with Malaysia individuals or institution, both as local as well as foreign contractors.

The market in Malaysia is becoming smaller for the increasing number of companies involved in construction. So that, effort must be made to strategies, consolidate and be prepared for exit and replacement. Foreign firms are often required to bid on large infrastructure projects in JV with local partners. JV bids must have at least 30% Bumiputera (indigenous Malay) participation. Malaysia's open-door policy to foreign participation is evidenced by the amount of Malaysia's payments for contract and professional services. Joint ventures with local partners forced the foreign firms to bid on large infrastructure projects, which possess at least 30% participation of the indigenous Malay. The amount of contract payments and professional services within Malaysia is evidenced by Malaysia's open-door policy to foreign participation.

The aim of the Delphi technique is to achieve consensus of opinion amongst the selected expert panellist in Malaysia on the primary factors in JV projects. It is primarily concerned with using selected expert panels to assist in gathering data and information to achieve research objectives, by designing a progressive series of questions to which a selected panel of expert responds. The basic research question is it possible to identify these factors by the adoption of a robust and replicable methodology and if identifiable, can these factors be ranked and weighted and considered critical. The results of this study are expected to provide useful guidelines for forming and operating effective and efficient JVs both in Malaysia and in other similar economies.

Overview of Construction Joint Ventures

Construction joint ventures have developed and are growing rapidly in Malaysia. However, a critical review carried out by Bygballe et al. (2010) highlighted that the actual and practice of partnering actually contradict the original intention of the CII, which is "a long-term commitment by two or more organisations for the purpose of achieving specific business objectives by maximising the effectiveness of each participant's resources". Besides, there has been little relatively empirical into the success factors associated with construction

joint ventures in Malaysia's construction industry (Adnan and Morledge, 2003). The formation of joint ventures has taken place at an unexpected rate over the last two decades. Particularly within the context of developing nations, joint ventures have been predominantly preferred by multinationals over other types of strategic alliances (Bower and Smith, 2004).

In addition, the economic crisis in 1998 unfavourably affected the performance of Bumiputera Contractors. Although the increase in the number of Bumiputera contractors, business ventures in the modern and dynamic sectors of the economy, a large proportion of them was concentrated in the construction sector and the lower-end services activities such as gas distribution, petrol kiosk operation and others. The Malaysian infrastructure construction and engineering industry has delivered impressive results with many projects being delivered through project-based joint ventures between 'local' and 'foreign' construction contractors (Walker and Johannes, 2001).

Mohammad and Torrance (2005) defined joint venture can be defined as two or more parties to jointly execute some commercial enterprise which may take the form of consortium, partnership or joint venture corporation in which the outcomes of success or loss is jointly held by the joint venture. Gale and Luo (2003) had stated that joint venture (JV) project based companies exist both as a mode of foreign investment and as means of technology transfer in Multinational Corporation might choose for doing business abroad in order to of increasing seriousness of commitment.

Jeffrey (2005) had mentioned the determinants of firms' use of explicit call options to acquire equity in their international joint ventures (IJVs). Such options are an important contractual element of IJVs because they allow a firm to secure a claim on future expansion opportunities and to safeguard itself against various exchange hazards. He draws on real options and transaction cost arguments, respectively, to develop hypotheses on the circumstances under which firms use such options. Turner (2009) distinguished that success criteria are "*the dependent variables by which we will judge the successful outcome of the project*". In other words, it is about how to realise the predefined project objectives in IJVs. It should consider the performance achieved through the various management strategies of IJVs.

Ozorhon et al. (2010) highlighted that performance of IJV management was based on the their management control in different levels such as strategic control at board of directors level, operational control at general management level, as well as organisational control imposed by the partners in forming the venture's organisational structure, processes, and operating routines. We could observe that the role by the CEO/GM is very critical at the first level. It is for the effective management of the IJV, as this is the focal point for the maintenance of relationships with each of the parents (Petrovic et al., 2006). Subsequently, operational control at general management level should focus on proper staffing and technical requirements of the IJV (Petrovic and Kakabadse, 2003). The last level is how the control by the ventures.

Williams (2016) distinguished that success criteria are the factors that contribute to the successful outcome of the project. In other words, it is about how to realise the predefined project objectives in IJVs. It should consider the performance achieved through the various management strategies of IJVs. Ozorhon et al. (2010) highlighted that performance of IJV

management was based on their management control in different levels such as strategic control at board of director's level, operational control at general management level, as well as organisational control imposed by the partners in forming the venture's organisational structure, processes, and operating routines.

PROBLEM STATEMENT

The government for Malaysia is encouraging and supporting local contractors to participate in regional and global market based on their expertise and experiences of construction of building, infrastructure projects, highways, power generation, port and airport coast. Foreign contractors have been operating in Malaysia long before the signing of the GATS accord in January 1995. At that time, foreign firms were admitted, mostly in a non-discriminate manner, where there were no rigid trade related sanctions on their 100% foreign owned firms that were allowed to operate Malaysia's domestic market. Currently the implementation of its commitment under GATS, market access restriction promulgated by Malaysian regulators have opened opportunities to foreign firms to operate through joint venture with Malaysia individuals or institution, both as local as well as foreign contractors.

Effort must be made to strategies, consolidate and be prepared for exit and replacement. Foreign firms are often required to bid on large infrastructure projects in JV with local partners. JV bids must have at least 30% Bumiputera (indigenous Malay) participation. Malaysia's open-door policy to foreign participation is evidenced by the amount of Malaysia's payments for contract and professional services.

The problems and difficulties should be identifying because obviously it can cause unstable and run into trouble manner during implementation and operation of the project with the foreign venture. Besides, there are also some challenges in order to establish the trust and partnering success factor and also strategies for competitiveness in international construction that have to be adopt in the near future. In addition, natural barriers such as language, ethnics' culture and local standard were also an obstacle in doing joint venture projects. When culture cross, a cultural shock can occur, so that impact on the organisational, work and co-ordinations. The joint venture projects are subject to face several problems: technological, financial, legal, equity control, profit margin, size compatibility, socio-cultural and political. A planned approached is necessary throughout all these aspects by both partner in order to ensure successful implementation of joint venture project.

As a result, in variety of behavioural, cultural and administrative make the management of a joint venture a demanding task in terms of time and effort and management hence, such ventures need a careful analysis in evaluating the probabilities of problems, challenges, success of the joint ventures.

METHODOLOGY AND ANALYSIS

Following a thorough literature research, 21 factors critical to the success of construction JV projects was identified. These factors were then assembled into questionnaire survey that was distributed to 1630 local and 70 foreign contractors in Malaysia. A response rate of twenty (20%) 341 was obtained. The purpose of the questionnaire survey was to discover which companies had experience of JV projects, the extent of that experience and their views of key factors associated with joint ventures.

The 2nd part of the research involved an in-depth interview conducted in Malaysia which involved 43 participants from various foreign and local company. It was carried out with the Chief Executive Officers, General Managers to provide detailed information in their company structure, management and experience of any JV projects undertaken in Malaysia. The experienced professionals included the senior staff of construction companies, like managing directors, executive officers, and general managers. A large ranking to postal survey was confirmed through the analysis of interviews. The questions confined in the survey were based on findings of literature studies. It was necessary for the participants to discuss at least one successful completion of joint venture project in Malaysia. However, they were also encouraged to share their experiences of failed joint venture projects. An interview guide was formulated to guide the participants throughout the interview session. Results from interviews confirmed the postal survey results of having at least 90 per cent the same 12 ranking CSF.

To confirm that the CSFs discovered by this process are reliable, a Delphi Technique which involved expert panels in Malaysia were conducted to validate/confirm the final findings. A triangulation approach had been adopted for this study which enables to integrate the quantitative results (questionnaire surveys) with the results from the qualitative method (interviews). This will prove useful, as the research process will be more robust enable a much higher quality reliable data to be gathered and results to be achieved.

The results revealed that various joint venture projects within Malaysia consist of 15 commercial buildings, 7 industrial buildings, 9 civil engineering works, 6 residential buildings, 3 public building and 2 petrochemical works. However, these projects included the construction of tunnels, airports, roads, flyovers, hospitals, stadia, sewerage works, and railway tracks. 13 of the joint venture projects were between foreign contractors and locals; whereas, 30 joint venture projects were among the Malaysian locals. A wide range of ownership structures are represented as needed by the joint venture agreement on particular projects (30 - 70% equity). The results revealed that local contractors had ability to hold equity level as low as 30% and as high as 70%, with average of 50%. Therefore, majority of the companies in Malaysia preferred to be shareholders. The present study has involved 2 Built, Operate, and Transfer (BOT), 3 engineering contracts, and 38 joint venture projects. All the foreign contractors from Germany, India, Japan, France, Australia, and USA were situated in Kuala Lumpur.

Implementation of Delphi study

The final findings were confirmed by having the Delphi technique that was taken from the Greek Oracle's skills of interpretation and foresight. The Delphi was developed in the 1950's by the Rand Corporation for the US Air Force concerning the use of expert opinion (Renzi & Freitas, 2015). The procedure was designed to obtain the most reliable consensus of opinion of a group of experts by a series of intensive questionnaires interspersed with controlled opinion feedback, with the results of each round being fed into the next round (Rowe & Wright, 2011). It involves the selection of procedures for suitable experts, development of appropriate questions to be put to them and analysis of the answers given by them (Xia & Chan, 2012). The intended outcome is that by the final round the experts will have reached a consensus of opinion on the issues put before them.

Delphi is an iterative forecasting procedure characterized by three features (Kermanshachi et al., 2020) anonymity; iteration with controlled feedback; and statistical response. Panel members remain unknown to one another respond to a series of questionnaires. The iterative nature of the procedure generates them to modify their assessments and projects them beyond their own subjective opinions. It can represent the best forecast available from the consensus of experts (Renzi & Freitas, 2015). The process is continued until a consensus is reached on the various issues under consideration, or until it becomes evident that no further consensus can be developed (Ameyaw et al., 2016). Generally, Delphi runs to two to seven rounds of questioning, at more. The major difficulties of Delphi, however, lie in maintaining the high level of response and in reaching and implementing a consensus (Kermanshachi et al., 2020).

In this study, 22 experts were selected based on the recommendation from the contractors involved in the previous in-depth interviews conducted in Malaysia. Emails were sent to the experts in Malaysia to get their approval to be in the Delphi group. The 19 expert panels were Chief Executive Officers, Executive Directors, Senior General Managers with vast experience and numbers of past and present JV local and overseas works and 3 academicians from the Malaysian universities who involved in JV projects.

The questionnaire consisted of 21 factors critical to success of construction JV projects were sent out with a four week return period, followed by email phone calls to encourage participation. There was 86% response with 19 experts (out of 22) returned the questions. The experts were asked to rate each statement on a 4-point Likert-type rating scale in terms of their criticality. They were encouraged to add additional comments at the end of the questionnaire. Round two of the study provided the expert panel with 21 statements of contents with some amendments given by the comments from the experts during the first round. They were given the numbers of response of each factor based on the scale of criticality again. to achieve consensus in the statements added by the panel during the first round, the experts were directed to review their rating again in terms of their criticality. The second questionnaire was sent later and there were 77% responses with 17 experts returned the questionnaire. Most of the experts had reconsidered and make adjustments to their score.

RESULT AND ANALYSIS

The responses were then compiled and analysed using the above procedure and formula. The questions were analysed by providing numerical scores on each of the scale of criticality with 100 points on Extremely Critical (4), 50 points on Critical (3), 10 points on (Less Critical) and 0 points on (Not Critical). These scores were then transformed to importance indices to determine the relative ranking of the attributes. A Relative Importance Index (RIX) was then developed to convert the E-Scores into a decimal figure using the following formula taken from Aghili et al. (2019):

$$\frac{\sum W}{A \times N}$$

Where W = weighting given to each factor in the evidence scale, A = the highest weight applied, N = total number in sample.

Consensus was achieved on 7 CSFs, which include inter-partner trust, criteria for partner selection, mutual understanding, agreement of contract, compatibility of objective and management control. Kermanshachi et al. (2020) points out that consensus can simply mean a 'group opinion, general agreement or group solidarity in sentiment and belief. The panel selected these CSFs as being high importance to the implementation of construction JV work in Malaysia.

These factors scored 0.80 or more on the RIX scale and were considered as extremely critical success factors where if the factors were included, may increase the chance of success but if left out will increase the chance of failure (Morledge & Owen, 1999). The factors that score less than 0.80 on the RIX scales were not considered as critical. Fourteen factors were designated as Failure Reduction Criteria (FRC) which if included in the project, might reduce the chance of failure but would not increase the chance of success (Morledge & Owen, 1999). In addition, to the RIX scale, the percentage of respondents scoring 4 (extremely critical) with 80% and more was used to rank the most critical success factors. If the RIX were equal, the distribution of the percentage of each scale will be taken into account. These were confirmed too by the scores of 50% to 74% from results in Round One.

Table 1. Perceptions of the Finalised Project Success Factors from Round 1 and Round 2

No	Project Success Factors	Relative Importance Index (Rix)
1	Inter- Partner Trust	1
2	Mutual Understanding	0.96
3	Criteria for Partner Selection	0.94
4	Agreement of Contract	0.91
5	Compatibility of Objectives	0.88
6	Commitment	0.85
7	Conflict	0.82
8	Communications	0.61
9	Cultural Understanding	0.55
10	Profit	0.54
11	Partner Experience	0.54
12	Financial Stability	0.53
13	Cooperation	0.53
14	Equity Control	0.53
15	Management Control	0.48
16	Coordination	0.46
17	Effective HRM	0.43
18	Motivation	0.3
19	Organizational Structure	0.24
20	Knowledge Transfer	0.17
21	Size Compatibility of Partner Firms	0.12

There were increased on convergence of opinion among the responses agreed in the factors during the second round. Although three round sequences seem to be the most popular and recommended method, there were two cases where two rounds were found to be satisfactory (Olsen, 1982). It was judged from the response of the experts to be the second round that the marginal gain from the third round may be small compared to the effort required to perform it, because of the declining participation and it was agreeable to stop the Delphi study at the second round. This confirmed with Dalkey (1969) that answers are most accurate on Round Two and became less accurate on subsequent rounds. The Delphi final results confirmed the questionnaire surveys and in-depth interviews, which produced the similar results where 85% of the respondents agreed on the seven CSFs and the fourteen FRCs.

Inter-Partner Trust

Meanwhile, mutual trust among partners in the forms of inter-partner trust within the JV is crucial in creating a healthy project environment. Mutual trust is critical to a long-term partnership besides improving the performance of JV project and in the context of international JVs, host and foreign partners must trust each other and ensure that only competent staff are assigned to the project management team (Hwang et al., 2017). According to Gale & Luo (2004), the mutual understanding and trust among partners can be developed but would take some time as it were influenced by the willingness to share information and knowledge. This was also supported by Pao et al. (2015) where the extent of agreement and disagreement between project managers on both trust and partnership management issues is not only used to measure the level of strength and conflict within partnership but also subject to more information gathering until consistency is achieved. In construction project management, an affective trust helps yield better project performance by reducing the threat of environmental uncertainty (Pao et al., 2015). Hence, the explanation on the inter-partner trust is indirectly linked to other CSF namely knowledge transfer.

Mutual Understanding

As JV is a process of combining ideas, expertise, workforce and finance to work within one organisation, the successful of the project depends entirely on how the organisation works. Organisations will function better if there is an open communication, mutual understanding and trust, co-operative relationships as well as a participative decision (Huczynski & Buchanan's study as cited in Trafford & Proctor, 2006). Therefore, the mutual understanding between partners in JV project are closely related to how they communicate. Rojas et al. (2018) also highlighted that the quality of interactions is being measure in the forms of interactions that produce novel insights and display a sound strategic understanding. Mutual understanding explains on something that it has been said them to do among the partners, but in reality, is failed to achieve (Nevstad et al., 2018).

Criteria for Partner Selection

Prior to commencing the JV, parties who host the project will define several sorts of criteria before selecting the new partner or re-continuing the new project with the existing partner. Nevstad et al. (2018) explains the successful practice of project partnering in three dimensions i.e. who related to participant selection; what related to task clarification; and way related to partnering means where the first dimension is strictly focus on the critical evaluation of partner selection. This can be done through the transparent procurement processes for partner selection. Even though criteria in selecting the partner is vital before starting the JV projects, several evidence reported a contradictory finding. For example, in assessing the success factors for JV construction projects in Nigeria. Famakin et al. (2012) found that the criteria for partner selection at the reactivation stage were among the less significant factor from the study. Famakin et al. (2012) however found that the communication, compatibility of objectives and mutual understanding are the significant contributors to the performance of JV in construction. The differences in the nature of projects and working culture might be a good explanation to the findings.

Agreement of Contract

The trust system is usually being supported by the contract (Wilson & Brennan, 2009) especially trust that is held under the JV. After discovering the right partner, JV will step into the agreement stage, which involves developing both formal and informal contracts and signing obligations to prevent moral risks (Xue et al., 2018). JV is formed under a contractual agreement, rather than taking the form of equity and typically a short-term or one project agreement that is launched on a project basis and sometimes called a consortium, contractual JV, or contractual alliance (Hong & Chan, 2014). Since the agreement of contract have been embroiled under the JV's definition, all parties signing the JV are required to define all partners' and third parties' roles, commitments, responsibilities as well as distribution of profit and loss that is usually being translated into risk sharing. For instance, in studying the applicability and utility of supply chain segmentation of infrastructure projects, Godsell et al. (2018) reported that JV partners were agreed to share risk among them, rather than passing it upstream to suppliers. Nevertheless, the risk will be passed to the suppliers through the JV contracts while practicing the behavioural contracting principles (Godsell et al., 2018). In case of breach of contract, the contractual agreement signed during the JV served as a primary evidence to report the partners' misconduct and malfeasance in court. Therefore, agreement of contract served as a term of reference to work according to the work plan that has been specified and allows both parties to sustain their relationship until the completion of the project.

Compatibility of Objectives

Franco as cited in Mamavi et al. (2015) stated that compatibility of objectives is one of the key factors for alliance (in this study referring to JV) success. This also were supported by Famakin et al. (2012) where the performance of JV projects depends highly on the compatibility of objectives among others. Each partner must have the ability to channelise their project expertise, workforce capacity, financial capacity among others in the JV to support on the project's objective or in other words, the targeted objectives will be integrated as a team. This compatibility is also something that needs to be scrutinised at the partner selection phase. Rod et al. (2009) draws attention to the lack of compatibility in discussing the issues related to the lack of trust in partner. Even though Rod et al. (2009) study is focused on JV in the UK health technology sector, it seems necessary to highlight the likely situation to exist after establishing the JV in the context of property construction. Various strategic actions can be taken to achieve the compatibility of objective among partners of JV. Monios & Bergqvist (2015) illustrates several measures to increases partner compatibility including rationalisation and alignment of processes, decision synchronisation and so forth.

Commitment

A study by Dulaimi (2007) found that a lack of clear commitment and intent to create an environment conducive to knowledge sharing and the incompatibility between the foreign and local cultures as the major barriers to effective knowledge sharing in construction JV. Despite organisational commitment sorted into three main categories of affective commitment, continuance commitment and normative commitment (Meyer & Allen, 1991), the commitment function in the organisation particularly JV can only be achieved if every individuals have a faithful commitment to the group and the combination of individual

commitments will lead to effective planning, executing and controlling where every individuals in the ventures performing their responsibilities towards the project success. Vaidya (2012) stated that the mentality of individuals who think that they will lose the investment (after investing time, effort, and other resources while working for organisations) if quitting an organisation, will contributes to the continuance commitment to the organization. From another point of view, commitment is seen in the form of financial and resource obligations. According to Koch & Koch (2018), resource commitments also served as a measurable element for the tangible aspects of trust that is associated with JV performance.

Conflict

Deutsch as cited in Wong et al. (2018) defined conflict as incompatible activities, such as when decision-makers are proposing different solutions to a problem. Conflict should not be confused with opposing goals and interests as conflict can occur over how to best reach compatible goals (Wong et al., 2018). In addition to conflicts that are associated with the incompatibility of objectives and technical problems on site, professional disrespect is also a major source of conflict as the construction industry involves high integration of professions, work packages and JVs. Godsell et al. (2018) stressed that possessing a multi-partner alliance is exponentially more complex as compared to traditional JVs which just involving two to three partners. It signifies that the level of conflict in project management is also lean on the capacity of JV. As JV will benefit participants in risk reduction and increasing their physical and financial capacity, certain degree of conflict will be disregarded as it can be monitored under conflict management strategy. Lau & Tovstiga (2015) also confirmed that conflict resolution, trust, commitment and cooperation are the key success factors in the formation and operations of a JV partnership. Other evidence in identifying the mechanisms to manage conflicts in international JVs, Wong et al. (2018) found that collectivist values support cooperative conflict management that in turn facilitates JV learning and performance. Collectivists emphasizing the collective goals and success rather than just one's own (Wong et al., 2018).

DIFFICULTIES IN CONDUCTING THE DELPHI TECHNIQUES

It is important that panel members treat the work seriously and devote the time necessary to provide thoughtful and reasoned responses to the questions. Secondly, the wording of the questions and the presentation format of the survey were extremely important (Robinson, 1991). It is very important to keep the whole panel responding to each round of Delphi and finally, the successful rounds of Delphi technique were time consuming. This study was taken with relative success in that a response rate of 77% was achieved and considered relatively high and acceptable for the purposes of this research.

CONCLUSION

The Delphi method was preferred to validate the final findings as it involved panellists who are knowledgeable in their area of expertise to provide the reliable data on JV projects in Malaysia. This is because they were experts who could confirm the results of this study. The Delphi Expert Panel resulted in the identification of seven critical success factors as being extremely high importance to the construction JV in Malaysia which require a significant

level of application in order to facilitate additional success. Fourteen factors were identified as FRCs and without these elements a project will risk the significant chance of failure. The results of this study are expected to provide useful guidelines for forming and operating effective and efficient JV both in Malaysia and in other similar economies.

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THE INFLUENCE OF CONTRACTUAL BEHAVIOUR ON ROAD PROJECT PERFORMANCE

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Abstract
Roads have become the important means of connecting economic activities in a country. Providing good and efficient roads in country by the government is not merely for the usage of citizen, but to attract the attention of foreign investment. As it is dominantly initiated by government sectors, the performance of the road projects is always observed. Unfortunately, many road projects in Malaysia are associated with unsatisfactory performance in terms of cost, time and quality of the delivered products. This study aims to determine the contractual aspects and how they lead to unsatisfactory performance. The objective of this study is to identify the common contractual behaviours of key participants in road projects which largely reported as one of the main factors which reduce the project performance. The outcome of this study measured the relationship of the contractual behaviours and road projects performance. Questionnaire survey were conducted to undertake the research. 178 feedbacks received out of 800 questionnaires distributed to the G7 CIDB registered contractors and professional engineers registered under Board of Engineers Malaysia (BEM). Descriptive analysis and correlation analysis were used in data analysis. The findings found that among the six (6) contractual behaviours of key participants in road projects investigated in this study, the delay in making payment was ranked as the highest occurrence followed by lack of communication skill of contractors and lack of communication skill of engineers. While lack of usage of Standard Form of Contract (SFoC) in making decision, unauthorised instructions, obeying the unauthorised instruction were low occurrence in Malaysian road projects. Result of the correlation analysis found that the influence of contractual behaviour of key participants on road projects performance were limited where only communication skill of engineer, communication skill of contractor, delay in making payment and lack of usage of SFoC in making decision by engineer influenced the performance of road projects. Thus, in the attempt to observe the performance of road projects in Malaysia, these aspects are critical to be put more concern.

Keywords: *Contractual behaviour; performance; roads project; Standard Form of Contract.*

INTRODUCTION

Roads are undeniable important to a nation. Other than facilitating the humans' daily businesses, they serve as the country's development by underpinning the economic and linking social activities. Due to the taxpayers' money used to finance road projects in Malaysia, thus their performance has become the concern of the government. Unfortunately, regardless how big allocation and critical attention given by the government, this is useless if all this while there has been many critics in the delivery of road projects in Malaysia. This includes that a lot of civil engineering projects have been beset by cost overrun, schedule delays, shoddy workmanship and many more. Many road projects in Malaysia have been delivered to the public usage not at their best condition and specification. One of the examples is the Middle Ring Road 2 (MRR2) where parts of the nine-year-old MRR2 had to be closed for repairs over a three-week period after pieces of concrete fell from its pillars (Adnan et al., 2012 and Quay & Ting, 2009). According to Deborah & Kamini (2008) the additional cost

for the repair works for all the MRR2 pillars except one was RM70 million has made the total cost for the procurement of this MRR2 project become RM308.8 million. Besides, other example of unfavourable performance of road project in Malaysia is that the project abandonments especially in remote area for instance Phase II road project from Meritam to Buang Abai in Limbang (Ismail, 2015), road project from Tanjung Batu to Kampong Lubuk Paku in Maran (Sinar Harian, 2012), road project from Simpang Jengka 8 to Maran in Jerantut (Utusan Online, 2014) and many more. All these incidents have tarnished the effectiveness and the accountability of the government especially the Malaysian construction industry sector in delivering roads to the public. Therefore, this opens up a space for an in-depth study on why does road projects in Malaysia repeatedly delivered with unsatisfactory performance.

Despite unsatisfactory performance of road projects, however, the government via various agencies are always looking for solutions to eradicate these problems. Therefore, the underlying factors causing the problem are critical to be investigated. According to Toor & Ogunlana (2009), most of the problems in construction projects were related to the contractual behaviours of key participants of the project. The contractual behaviours of the key participants i.e. delay in paying interim payment, late in giving possession, architect's behaviour, adversarial relationship and poor communication are among other things that affect the project performance (Jaffar et al., 2011; Sambasivan & Soon, 2007; Chini & Valdez, 2003; Ling et al., 2013). Unfortunately, none of the study done by the aforementioned authors differentiates by the types of project and mostly focused on the general building projects. Thus, the contractual behaviours of the key participants viewed by many previous researchers as important factors that affect project performance. Since there are very few studies carried out to explore the contractual behaviours on road projects, therefore, the objectives of the study are to identify the common contractual behaviours of key participants in road projects and determine their relationship with project performance.

LITERATURE REVIEW

Roads development in Malaysia

The modern road system in Malaysia is believed to begin at the end of 18th century during the British colonial (Leinbach cited in Raja Khairul Anuar, 2012). The trading needs and the centralization of colonial administration had accelerated the construction of roads in Peninsular Malaysia. Therefore, the construction of roads had helped the British colonial administration by connecting the administrative centre, commercial area, industrial area, farming area and ports (Majid, 1980). Thus, before independence, all of the roads in Malaysia were built by the British. Since then, Malaysia continues to expand and upgrade the road networks it inherited from the British administration. According to Naidu (2008) road development in Malaysia has taken place in accordance with plans outlined by the government in the form of five-year plan which is known as Malaysia Plan, and a longer-term Outline Perspective Plan.

The landscape of the road networks in Malaysia is classified into two broad categories, namely Federal Roads and State Roads. According to Raja Khairul Anuar (2012) the roads that built and maintained by the federal government using federal fund are categorized as federal roads. The federal roads are the major interurban roads joining the state capitals and roads leading to points of entry to and exit from the country and declared under the Federal

Roads Ordinance (1959). While State roads generally comprises of the primary roads providing intra-state travel between the district administrative centres. Other roads included in this category are the urban collector roads under the municipalities and other minor roads within the villages and the rural inhabited areas under the Districts Offices.

Road Projects Performance Criteria

Time, cost and quality are the common performance variables and have been extensively used for decades in determining the construction project performance. This dimension which is called as 'The Iron Triangle' concept up to this moment is still considered as the central to measuring project performance (Papke-Shields et al., 2010). By using this 'The Iron Triangle' concept, the construction projects generally considered as successful once they meet those criteria. Likewise, Chan and Chan (2004) argue that construction performance can be assessed on objective, i.e. time and cost and subjective, i.e. quality in satisfaction). It is noted that both quality of workmanship and satisfaction of client of the building are subjectively measured according to the respondents' perceptions. The measurement of client satisfaction includes the quality of service, quality of end product and quality of manner (Abdul Aziz, 2012) to meet the expectation of the clients. However, in the present study, the quality is measured on the quality of workmanship, not to the extent of the quality of service that include in measuring the satisfaction of the client. Hence, the performance criteria used in this study are cost variance, time variance and quality of workmanship.

Contractual Behaviour of Key Participants of Road Projects

Key participants of a construction project will vary based on the types of construction project as well as the size of the construction project. For instance, the key participants in general road projects are the client, the consultant teams (which lead by the engineer) and the contractor. Due to many key participants with their respective organisations involve in a construction project, the need for a contract is paramount to ensure the well integration and cooperation among themselves in implementing the project. Prevalently, instead of the contract lead to project success, many construction projects eventually ended up unsuccessful with variety of conflicts occurred among the participants. Alaghbari et al. (2007) listed out that excessively late supervision and slowness in making decisions; slow in giving instructions; lack of consultant's experience; incomplete documents; lack of consultant's site staff experience (managerial and supervisory personnel); absence of consultant's site staff; financial problems; shortage of materials on site; poor site management; construction mistakes and defective work; delay in delivery of materials to site; coordination problems with others are among the important causes of problems that will reduce the success of construction project in Malaysian context. This shows that the problems rendered in construction projects caused by the behaviour of key participants who do not duly adhere to the condition of contract in the project implementation.

Thus, in this study, the term 'contractual behaviours of key participants' are referring to an action or a conduct of a key participant towards other key participants of the project based on what are stipulated in the agreed contract. In other words, the contractual behaviours of project key participants are referred to what extent the contract is implemented by the people who make decision by the contract. The contractual behaviour of the project key participants who fail to duly adhere to and comply with the terms of contract contribute largely to conflicts

among key participants and increase difficulties in the management of project, hence hinder the project success. Delay of paying payments (El-adaway et al., 2016; Nurul et al., 2016; Adnan et al., 2012), Usage of Standard Forms of Contract (SFoC) in making decision by Architect (Abdul Aziz, 2012) and poor communication skills of contractor and consultant (Jaffar et al., 2011; Ahmed & Othman, 2013; Ling et al., 2013; Zhang & Fan, 2013; Sambasivan & Soon, 2007) are among the unfavourable contractual behaviour of key participants that prevalently have hindered the successful of construction projects.

Delay of Payment

The purpose of the interim payment is to ensure that the contractor is regularly paid throughout the progress of works. It is to maintain the contractor's cash flow and thus minimizing any deficit which may affect the smooth running of the project (Judi and Abdul Rashid, 2010). In addition, the interim payment is important to the contractor due to high investments made by the contractor at the preliminary stage of construction process (Ismail, 2008). Besides that, the received interim payments enable the contractor to finance his expenditures such as payment to material suppliers, workers' wages, rental of plant and equipment and other payments in relation to the implementations of the project. Unfortunately, literature is replete with payment issues which eventually causes conflict among contractor and client such as in Jaffar et al. (2011), Cheung et al. (2008), Cheung & Yiu (2006), and Kumaraswamy (1997). Similarly, Barough et al. (2013) highlighted that late in interim payment is a substantial factor that could lead to disputes in the Malaysian construction industry.

Both FIDIC and PWD 203A provide that whenever the contractor has finished or executed the works, interim payment shall be paid to the Contractor. But under Clause 28 PWD 203A required the S.O. to make a valuation of works executed by the contractor and unfixed materials and goods delivered to the site prior to the issuance of interim certificate. Commonly, the contractor will participate in the valuation process. Within 14 days after the valuation date, the S.O shall issue the Certificate of Interim Payment stating the amount to be paid to the contractor by the client. Next, the payment will be made by the client within the stipulated date in the Appendix in the contract. If there is no date stated in the Appendix the payment must be done within 30 days after the date of issuance of Certificate of Interim Payment to the contractor. Unfortunately, under PWD 203A (Rev. 2007), the contractor is not entitled to suspend work as a remedy for late payment by the client. In fact, PWD 203A (Rev. 2007) does not provide any ground for suspension of work for contractor nor to slow down the progress of the works. Further exacerbating the situation, there are only two options that can be made by the contractor whether to proceed the construction until finish and proceed with arbitration after practical completion or choose to terminate the employment under the contract under common law. Consequently, this matter creates dissatisfaction among contractors in Malaysia who contracted under PWD 203A (2007), where the delay in payment by the government as the client under this type of contract are prevalent in this industry.

The Communication Skills of Contractor and Engineer

Communication is one of the major sources of conflicts and disputes reported by many researchers (Wang, 2000; Memon et al., 2011; Fallahnejad, 2013; Shehu et al., 2014). In

building construction projects, Wang (2000) emphasised on the importance of architect's communication skill in Traditional Procurement System. Similarly, in road projects, the engineer, who is the sole contact of the owner, is also the leader and coordinator of the design team and responsible for the integration of the project. Communication skills are the ability to conduct effective communication among the project participants, therefore, good relationship between engineer and other participants determine the performance of the project implementation (Zhang & Fan, 2013). These relationships are formed early on and nourished by clear communication. Hence, without effective communication, it would be impossible for any construction company to compete in such a challenging operating environment.

The skill of communication of the engineer is paramount as the engineer acts as the leader in the project implementation team. In the Traditional procurement method, the engineer represents the client and is the leader and coordinator of the design team. According to Yu & Shen (2013) the communication skill of the engineer is very critical for well integration of the participants in implementing the construction projects. In addition, he is responsible for making sure that the planning phase of a project contains complete task definition, resources, time schedule, and a list of requirements, which the engineer must conduct through clear and effective communications. On the other hand, good communication skills by the contractor is also critical in this type of procurement method since the designs are prepared by the design team. In ensuring the smoothness of construction process, the good understanding on the design is paramount. Therefore, it requires good skills of the contractor in communicating with the design team. Subsequently, the main contractor must ensure the information flows efficiently to the numerous subcontractors' organizations (Rahmat, 2008). In addition, it is vital in road projects because of the involvement of large numbers of subcontractors compared to general building projects.

Giving and Obeying Unauthorised Instructions

In reviewing the literature on the unauthorised instruction given by the engineer towards contractor, it was found that no previous study has provided statistical evidence showing that this incident is common in this industry. As stated under contract, S.O (PWD203A) or engineer (FIDIC) is the agent of client who has full responsibilities in supervising and carrying out the works in the contract but he may only exercise the authority that attributed to them under the contract (Zulkifli et al., 2011). Contractually, the contractor must obey all authorised instruction by the S.O or engineer and in the event that the contractor fails to obey them, the contractor can be charged as breach of contract (Rajoo et al., 2010). However, it is important to investigate the severity of occurrence of giving and obeying unauthorised instructions in road projects since their impacts on project performance would be severe.

Usage of SFoC in Making Decision

Many delays, cost overruns, reworks variations, claims and disputes can be traced back to erroneous design, poor contract administration or lack of supervision of client's representative, which will relate to consultant's duty (Chini and Valdez, 2003). The engineer who lead the consultant team in road projects is the contract administrator, has two duties which are as an agent to the client and as certifier. As a certifier, the engineer is expected to certify payments, variation orders, claim for loss and expense, extension of time, etc. hence, he must apply his reasonable skill and diligence to all he is obliged to do according to the

contract without putting himself in a position where his own interests might be in conflict with his duty (Rajoo et al., 2010). Hence, the engineer must adhere to the condition of contract in all his decisions in project implementation. Although hired by the client, the engineer should never improperly allow client to influence his decisions. Therefore, the engineer has a duty to act fairly and impartially between the client and the contractor in issuing certificates.

Following the thorough literature review, six variables of contractual behaviour of the key participants were found relevant to the present study and have significance impact on the performance of construction projects. Thus, this study explores the contractual behaviours of key participants in road project such as lack of usage of SFoC in making decision, unauthorised instructions, obeying the unauthorised instructions, communication skills of engineer and contractor and delay in making payment. Next, determines their relationship with time, cost and quality performance as indicated in Figure 1.0.

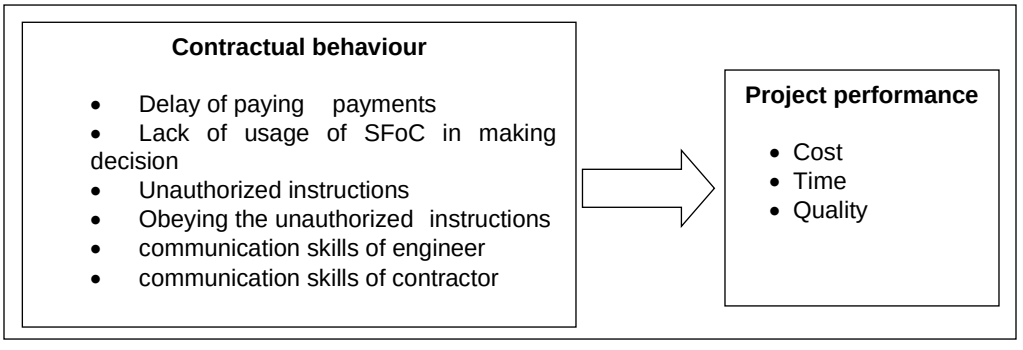

Figure 1. Theoretical framework of the research

METHODOLOGY

The study generally focused on road projects in Malaysia initiated by the government. This study excludes the projects initiated by the private clients, mainly because most of their road projects use bespoke standard form of contract tailor-made to suit the companies' requirements and policies. The data for this study was obtained from G7 of CIDB's listed contractors and certified professional engineers registered under The Boards of Engineers Malaysia (BEM). This study adopted a quantitative approach using questionnaire survey. The process started with an intensive literature review to identify the project performance criteria to be used in this study and the common contractual behaviours of key participants which have the possibility in affecting the project performance. It was found that six (6) contractual behaviours of key participants i.e. the usage of SFoC in making decision, unauthorised instructions, obeying the unauthorised instructions, communication skills of engineer and contractor and delay in making payment have possible effect on road project performance.

Next, a preliminary questionnaire survey was conducted by distributing to twenty (20) Grade G7 contractors and twenty (20) professional engineers. This phase has formed the foundation for subsequent phase and assisted in the design of the main survey. Twelve (12) responses gained by the cut-off date given and then the Reliability Test using Cronbach's coefficient alpha test was performed and the value of the test was 0.710, which was more than 0.7. This indicates that the 5-point Likert scale measurement was reliable, and the main questionnaire survey could be carried out to all respondents. Since the total population of this

study was large, it would be time consuming and not economical to conduct this research involving the total of 4151 numbers of respondents. Therefore, this research deployed questionnaire survey on the sample from the total population. Hence, the size of sample was important. This study estimated sample size was 255 out of the 4151 eligible target population with confidence level of 90% and 10% margin of error. This was calculated using an automated software program named Raosoft sample size calculator which can be accessed via http://www.raosoft.com/samplesize.html. This sample size calculator has been used by many researchers in variety field of studies to calculate the sample size of their research such as Alpak et al. (2015), Al-Bitar et al. (2013) and Al-Qazaz et al. (2011). Once the data collected and statistics were calculated from the samples, then inferences and extrapolation can be made and generalised to represent the total population.

The simple multiple choice and Likert-type of questions was used in collecting data. The questionnaires were distributed via e-mail, google form and personal face to face delivery. The data gathered was analysed using statistical software SPSS version 21. Descriptive analysis and Spearman correlation analysis were deployed to measure the relationship among the variables.

RESULT AND DISCUSSION

Out of 800 numbers of questionnaire sent out, only 178 numbers returned before cut-off date given representing 22% response rate. This is considered low and did not achieved the calculated sample size. However, Akintoye (2000) stated that it appears to be norm if the response rate between 20% to 30% for questionnaire survey in construction industry area. This might be due to the nature of work of the targeted respondents in construction are quite busy as well as the increasing number of research projects in this area, they become 'tired' of too many requests for data. As a result, they are unwilling to spend a lot of time entertaining such request, thereby, refusing to participate in surveys (Shehu & Akintoye, 2010).

Respondent's Demographic

The respondents of this study consist of 56% contractors and 44% engineer with 97% of their position at their respective organisations are at executive level. Furthermore, the respondents' working experience in road projects were 40% more than 10 years' experience, 52% have experience between 5 to 10 years and only 8% have experience between 1 to 5 years. These indicate that the respondents of this study were capable and competent enough to participate in this study.

Table 1. Respondent organisation

Respondent's organisation	Percentage (%)
Engineer	44
Contractor	56

Table 2. Respondents' working experience

Respondent's experience in road projects	Percentage (%)
1 - 5 years	8
5 - 10 years	52
more than 10 years	40

Common Contractual Behaviour of Key Participants in Road Projects

The level of frequency of contractual behaviours of key participants in road projects was measured on a 5-point Likert scale where 5=High Frequent; 4=Frequent; 3=Moderately Frequent; 2=Low Frequent; 1=Never. The ranking assessment was done by calculating the mean value for overall respondents as tabulated in Table 3. It is found that delay in making payment was the most frequent contractual behaviour occurred in road projects (M=4.11), followed by lack of communication skill of contract (M=3.53) and lack of communication skill of engineer (M=3.44). Nevertheless, lack of usage of SFoC in making instruction, giving unauthorized instructions and obeying the unauthorized instructions were low frequent contractual behaviours occurred in road projects.

Table 3. Contractual behaviour of key participants in road projects

Contractual behaviour of key participants	Respondents	Mean	Std. Deviation	Ranks
Delay in making payment	178	4.11	0.410	1
Lack of communication skills of contractor	178	3.53	0.500	2
Lack of communication skills of engineer	178	3.44	0.509	3
Lack of usage of SFoC in making instruction	178	2.45	0.510	4
Giving unauthorised instructions	178	2.41	0.493	5
Obey unauthorised instructions	178	2.40	0.491	6

The high frequency occurrence of delay in payment in road projects perceived by respondents of this study reinforced the statement by many scholars that many construction projects in Malaysia and elsewhere experience delay in paying interim payment by the client such as Aziz & Abdel-Hakam (2016), Yong & Mustaffa (2012) and Murdoch & Hughes (cited in Mohd Danuri et al., 2006). This seems to indicate that this issue requires the attention of every party in the search for a better solution because delay in making payment would eventually lead to other problems such as project cost overruns (Memon et al., 2011), project delay (Aziz & Abdel-Hakam, 2016, Shehu et al., 2014, Alaghbari et al., 2007, Sambasivan & Soon, 2007) as well conflict among the project participants (Jaffar et al., 2011).

Although the result of this study found that communication skills of engineer and contractor was moderate level, the effects brought by the ineffectiveness of communication between them on project performance could be very severe. The finding accord with Aziz & Abdel-Hakam (2016) who found that lack of communication between consultant and contractor is important factors causing delay in road project in Egypt, causing cost overruns in public construction projects in China (Ling et al., 2013) and contributing to conflict and disputes among contracting parties in Hong Kong (Kumaraswamy, 1997). Thus, the result implies that effective communication techniques are essential for both in engineer firms and contractor firms in order to achieve effective communication flows. Direct contacts, meetings and the use of information technology may help to enhance the communication flows between parties.

Relationship of Contractual Behaviour of Key Participants and Project Performance

As shown in Table 4, out of 18 correlations, only four were correlated. Thus, it can be concluded that the influence of contractual behaviours of key participants on road projects performance is limited. In fact, they only influenced on time performance.

The Effect of Delay in Making Payment on the Performance of Road Projects

The result in Table 4 shows that the extent of delay in making payment is correlated with time performance. By referring to the correlation result in Table 4, delay in making payment is in-line with findings by many previous researchers who found that this factor is among the significant factors which can affect construction project performance (El-adaway et al., 2016; Nurul et al., 2016; Adnan et al., 2012). Interim payment can be considered as the 'blood' of the contractor in construction process to maintain the contractor's cash flow and minimising the contractor's cash deficit (Judi & Abdul Rashid, 2010). As a result, problems in contractor's cash flow will affect the smoothness of construction process which eventually would prolong the construction duration. Thus, delay in making payment is the undesirable contractual behaviour of the client towards contractor which could give significant impact towards road project performance.

Table 4. Correlation matrix between contractual behaviour of key participants and road projects performance

Contractual behaviour of key participants	Cost overruns	Time overruns	Poor quality
Lack of usage of SFoC in making decision by engineer	0.034	0.166*	0.123
Unauthorised instruction	0.057	0.034	0.127
Obey unauthorised instruction	0.057	0.034	0.127
Communication skills of engineer	-0.136	0.180*	0.099
Communication skills of contractor	-0.089	0.175*	0.140
Delay in making payment	-0.089	0.175*	0.140

*. Correlation is significant at the 0.05 level (2-tailed).

The Effect of Lack of Communication Skill of Engineer and Contractor on the Performance of Road Projects.

The result in Table 4 shows that the extent of communication skill of engineer is correlated with time performance. Communication of both engineer and contractor is crucial in translating the design to construct. In fact, poor communication often means lack of cooperation in the interpretation of design and contract documents and a general feeling of distrust by the contracting community of the engineer's responsibility to assess the quality and quantity of the construction workmanship, materials and equipment so as to pass the contractor's monthly payment applications. Meanwhile, when delegating the works to the subcontractors, contractor must have good interpersonal and communication skills to ensure the information flows efficiently between many subcontractors. In fact, road projects often employ large number of subcontractors and they are independent of each other. The communication barriers such as failing to communicate and physical walls between main contractor and numerous subcontractors' organisation should be removed. Thus, ineffective communication among the engineer, the contractor and subcontractors certainly would disturb the smoothness of construction progress and lead to the conflict among the project key participants (Mitkus & Mitkus, 2014 and Sambasivan & Soon, 2007). Eventually, could lead to poor time performance of road projects.

The Effect of Lack of Usage of SFoC in Making Decision by Engineer on the Performance of Road Projects.

The result in Table 4 shows that the extent of engineers used SFoC in making decision is correlated with time performance. The result indicates that if there is lack of usage of the

Standard Forms of Contract in making decision by the engineer, the time performance could reduce. This means that the engineer should refer to the SFoC in making any decisions as well as any instructions. For instance, late in giving instruction or information i.e. drawing and specification to the contractor without obeying to the time frame stipulated in the contract certainly could lead to project delay (Alaghbari et al., 2007) The result is expected because the supervisory responsibility of an engineer is to monitor and manage the road projects construction according to the contract as it is critical to avoid construction delay. The result implies that engineer should decide based on the provisions of the contract in performing works and should not resort to unlawful behaviour.

Meanwhile, the result also reflects that the failure of project key participants to familiarise with the condition of contract will significantly affect the performance of road projects. According to Rajoo (2010), contracting parties must be familiar with particular SFoC used and not to solely rely on others for advices on contractual obligations. The lack of understanding of the project key participants on the SFoC while pursuing each other obligation under the contract may cause poor communication among them and conflict where eventually affect the time performance.

CONCLUSION

Road projects performance in Malaysia is considered unsatisfactory where most projects associated with severe cost and time overruns. Therefore, a mitigating action must be put into road projects to ensure future projects can be delivered satisfactorily as required. This study attempts to contribute a solution by identifying the contractual behaviours of key participants that affect the road projects' performance. The result of this study found that the occurrence of delay in making payment by client and problems associated with communication skills of contractor and engineer were dominant in road projects in Malaysia which have the possibility lead to unsatisfactory performance. Furthermore, lack of communication skill of engineer, lack of communication skill of contractor, delay in making payment by the client and the lack of usage of SFoC in making decision by the engineer were the contractual behaviours which correlated with time performance. Therefore, these four undesirable contractual behaviours of key participants in road projects need to be given more attention by the government and project participants to ensure a satisfactory delivery of road project to citizenry.

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INFLUENCING FACTORS FOR ENABLING TRANSFORMATION OF FACILITIES MANAGEMENT IN MALAYSIA

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Abstract
Facilities Management (FM) is a recognized field with practitioners in many countries. The current issue in Malaysia is FM still at an early stage of development, and there is a need for greater cognizance of the important role FM can play in supporting the main business of organisations. The purpose of this paper is to indicate the transformation in FM towards business globalisation and to achieve the value for money, growth of customer satisfaction index, increase work productivity and the stability of the business environment of an organisation. Transformation strategies is a change within organisations, teams and individuals that focuses on future needs. Therefore, in order to create the transformational framework, Organisational Behaviour (OB) has been adapted in this study to look into the improvement in the FM role more specifically. A questionnaire survey was developed comprising of four sections and was finalised after validation by the expert panels from the Facilities Management Industry and was revised for the data collections. 341 questionnaires were distributed and a total of 155 responses were received from the Facilities Management Companies in Malaysia and were analysed using the Analysis of Moment Structures (AMOS). Prior to this, the structural model was developed to foresee the relationship within variables for a collaborative strategy. The originality of this paper is the application of Structural Equation Modelling (SEM) as a tool to enhance research and to improve the integration within the management levels for better performance in the future.

Keywords: *Facilities management; transformation; strategies; structural equation modelling; organisational behaviour; management.*

INTRODUCTION

FM can be said as a vital profession nowadays that highlights on the business strategy, innovation, financial, and people (human resource) towards the recognition, identity and image of FM field (Maszuwita, 2014). It also brings added value to an organisation by giving an organisation the power to focus on its core business and the supporting activities will be taken care by FM companies. According to Kaya et al. (2004), FM is often included at the operational level compared to the strategic level and has poor links between FM managers and top-level managers. It is important that FM be focused at the strategic level within organisations and this would enable FM to have closer relationships with clients, facilities support and facilitation in order to bring about changes in the organisation to achieve effectiveness and greater efficiencies (Price & Akhlaghi, 1999). As Ong (2009) has stated FM is not only about operation and maintenance; other non-technical aspects are equally important to ensure proper functioning of the built environment. This is important to create the FM transformation in Malaysia for industry globalisation to expand the competences in the global marketplace. Transformation can be said as an innovation or a paradigm shift for the FM industry to achieve their business goals and to enhance the knowledge within the FM managers.

LITERATURE REVIEW

The literature review is the main base for constructing the theoretical framework and most importantly, the variables have been identified as Independent Variables (Organisational Behaviour) that give an impact on Dependent Variables (Facilities Management Performance) and Moderating Variables that co-operates in order to foresee the development of the transformation strategies. The theoretical framework was identified through basic theories from the literature review and a representation of relationship within variables. Therefore, to recognise the variables more precisely construct measures were created according to first order construct, second order construct and third order construct respectively.

Table 1. Constructs and Measurement Items

Third-Order Construct	Second-Order Construct	First-Order Construct	Number of Items (114)
Organisational Behaviour (OB)	Organisation Environment (OE)	Organisational Process (OP)	5
		Team Dynamics (TD)	4
		Foundation of Employee (FE)	4
		Contemporary Challenges (CC)	3
		Program Development (PD)	7
	Competitive Skills (CS)	Interpersonal Skills (IPS)	5
		Informational Skills (INS)	5
		Decisional Skills (DS)	5
Facilities Management Performance (FMP)	FM Competency Areas (FMP1)	Technical (TC)	4
		Financial (FN)	5
		Management (MN)	5
	FM Quality (FMP2)	Quality Control (QC)	11
		Quality Improvement (QI)	10
		Quality Assurance (QA)	11
	Trails for FM Continuity (FMP3)	Workforce Learning (WL)	5
		Forecasting Renewal Cost (FR)	5
		Technical Process (TP)	5
		Facilities Asset Management (FM)	5
	Management Support to stimulate the growth of FM (MS)	General Factors (GF)	5
		Regional Factors (RF)	5

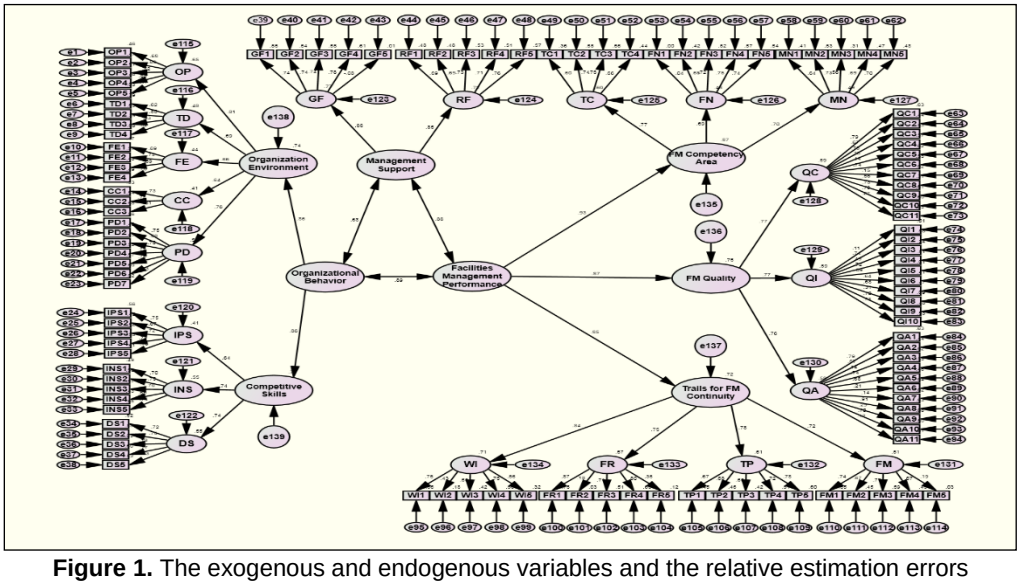

Figure 1. The exogenous and endogenous variables and the relative estimation errors

Table 1 and Figure 1 indicates the exogenous and endogenous variables that involves in this study. The construct measures are significant to develop the research hypotheses in order to create the relevant structural model that contributes to the development of FM transformation strategies. Therefore, 33 hypotheses were identified for the transformation strategies. Table 2 shows the research hypotheses and relevant structural models to achieve the research objectives.

Table 2. Research Hypotheses and Structural Models

Structural Model (SM)	Hypothesis Description
SM1	Organisational Behaviour has a positive influence on Facilities Management Performance
	Management Support has a positive influence on Facilities Management Performance
SM2	Organisation Environment has a positive influence on FM Competency Areas
	Organisation Environment has a positive influence on FM Quality
	Organisation Environment has a positive influence on Trails for FM Continuity
	Competitive Skills has a positive influence on FM Competency Areas
	Competitive Skills has a positive influence on FM Quality
	Competitive Skills has a positive influence on Trails for FM Continuity
SM3	Organisational Process has a positive influence on FM Competency Areas
	Organisational Process has a positive influence on FM Quality
	Organisational Process has a positive influence on Trails for FM Continuity
	Team Dynamics has a positive influence on FM Competency Areas
	Team Dynamics has a positive influence on FM Quality
	Team Dynamics has a positive influence on Trails for FM Continuity
	Foundation of Employee has a positive influence on FM Competency Areas
	Foundation of Employee has a positive influence on FM Quality
	Foundation of Employee has a positive influence on Trails for FM Continuity
	Contemporary Challenges has a positive influence on FM Competency Areas
	Contemporary Challenges has a positive influence on FM Quality
	Contemporary Challenges has a positive influence on Trails for FM Continuity
	Program Development has a positive influence on FM Competency Areas
	Program Development has a positive influence on FM Quality
	Program Development has a positive influence on Trails for FM Continuity
	Interpersonal Skills has a positive influence on FM Competency Areas
	Interpersonal Skills has a positive influence on FM Quality
	Interpersonal Skills has a positive influence on Trails for FM Continuity
	Informational Skills has a positive influence on FM Competency Areas
	Informational Skills has a positive influence on FM Quality
	Informational Skills has a positive influence on Trails for FM Continuity
	Decisional Skills has a positive influence on FM Competency Areas
	Decisional Skills has a positive influence on FM Quality
	Decisional Skills has a positive influence on Trails for FM Continuity
SM4	Management Support moderates the relationship between Organisational Behaviour and Facilities Management Performance

STRUCTURAL EQUATION MODELLING IN DEVELOPING THE FM TRANSFORMATION FRAMEWORK

Structural Equation Modelling (SEM) is developed through Analysis of Moments Structures (AMOS) and encompass two major stages which is Confirmatory Factor Analysis (CFA), and the Structural Model (SM). SEM is a collection of statistical techniques that allow a set of relationships between one or more independent variables and one or more dependent variables to be examined (Tabachnick and Fidell, 2001), adapted from Ahmad Bahjat (2007). The significant purpose of SEM is to explain the pattern of series of inter-related dependence

relationship simultaneously between a set of latent or unobserved construct. SEM has the ability to assess the uni-dimensionality, reliability and validity for each individual construct (Hair et al., 2006). Therefore, SEM is significant in this research to analyse the research hypothesis that has been listed in Table 2.

Confirmatory Factor Analysis (CFA)

The CFA model is used to detect the links between manifest or observed variables and latent or unobserved variables. The measurement model could therefore be said to define the manner in which latent or unobserved variables are assessed in terms of the manifest variables (Ho, 2006). Operationalisation of constructs is a very important step in the process of ensuring accuracy (Hair, 2006). In order to develop the CFA, the SEM is distinguished by the ability of its overall model fit and its ability to assess the construct validity of a proposed measurement theory (Hair et al., 2006; Ho, 2006). A number of Goodness-of-Fit (GOF) indices exist for the assessment of the overall fit of the individual construct CFA, measurements of overall CFA and hypothesized structural models. The GOF indices provide the factors to investigate the level of coincidences in the covariance matrix of the proposed model (Kline, 2010). Table 3 shows the summary of Goodness of Fit indices that has been adapted from Bahjat (2007).

Table 3. Goodness of Fit Indices (Bahjat, 2007)

Name of the Index	Level of acceptance	Comments
Absolute Fit Indices		
Chi-square (x2)	P > 0.05	This measure is sensitive to large sample
Goodness-of-Fit (GFI)	0.90 or greater	Value close to 0 indicates a poor fit, while value close to 1 indicates a perfect fit
Root Mean Square Error of Approximation (RMSEA)	Between .05 and .08	Value up to 1.0 and less than .05 is considered acceptable
Incremental fit indices		
Adjusted Goodness-of-Fit (AGFI)	0.90 or greater	Value close to 0 indicates a poor fit, while value close to 1 indicates a perfect fit
Tuker-Lewis Index (TLI)		
Normed Fit Index (NFI)		
Comparative Fit Index (CFI)		
Parsimonious fit indices		
Normed Chi-square (x2 /df)	1.0 ≤ x2 /df ≤5	Lower limit is 1.0, upper limit is 3.0 or as high as 5

Structural Model (SM)

The structural equation model is the second main process of SEM analysis. Once the measurement model is validated, representation of the structural model can be made by specifying the relationships among the constructs. The structural model provides details on the links between the variables. It shows the specific details of the relationship between the independent or exogenous variables and dependent or endogenous variables (Hair et al., 2006; Ho, 2006). Evaluation of the structural model focuses firstly on the overall model fit, followed by the size, direction and significance of the hypothesized parameter estimates, as shown by the one- headed arrows in the path diagrams (Hair et al., 2006). The final part involved the confirmation of the structural model of the study, which was based on the proposed relationship between the variables identified and assessed.

RESEARCH METHODOLOGY

In the preliminary stage of the study, a semi-structured interview was carried out within expert panels from the Facilities Management Industry to identify and validate the issues involved in the FM field as well as the impact of incorporating Organisational Behaviour (OB) as a primary data to develop the transformation framework. The expert panels stated that the development of the transformation strategies in FM will help to lead to the excellence in the organisation. Prior to conducting interviews, a thorough review of the literature is needed to assist the researcher to develop the framework and the research design. For this study, a questionnaire was designed which consisted of several sections with a 5-point Likert scale and the sample size was 341 throughout all the registered FM companies in Malaysia. Therefore, 155 questionnaires were valid and approximately 45.5 percent of those distributed is reliable. This mixed method was significant in this study that integrates the perception as well as the statistical results to create the transformation strategies.

RESULTS AND DISCUSSIONS

The structural model was produced from the feedback given by the respondents to foresee the collaborative strategy between Facilities Management and Organisational Behaviour for business success. The first structural model (Figure 2) tested the regression effects of Organisational Behaviour and Management Support on Facilities Management Performance. The R^2 value of the regression was 0.63 for the first structural model.

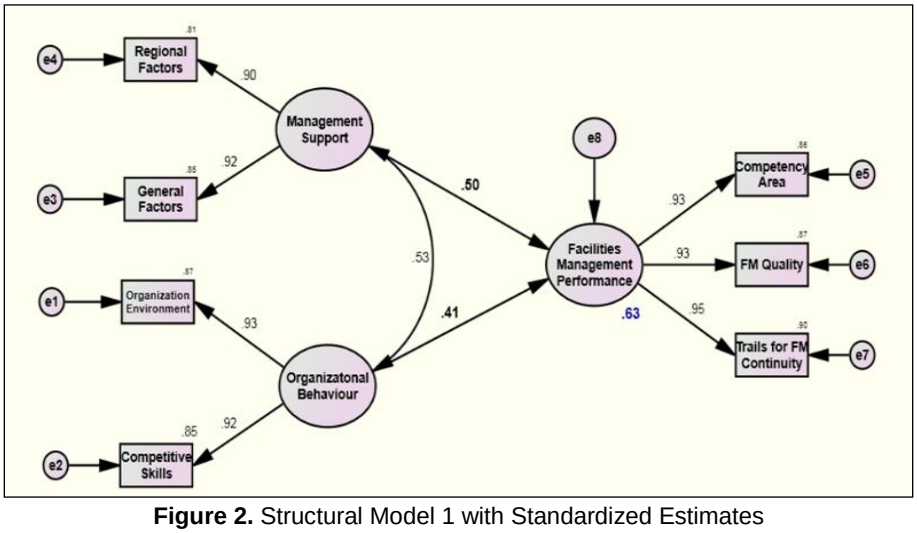

Figure 2. Structural Model 1 with Standardized Estimates

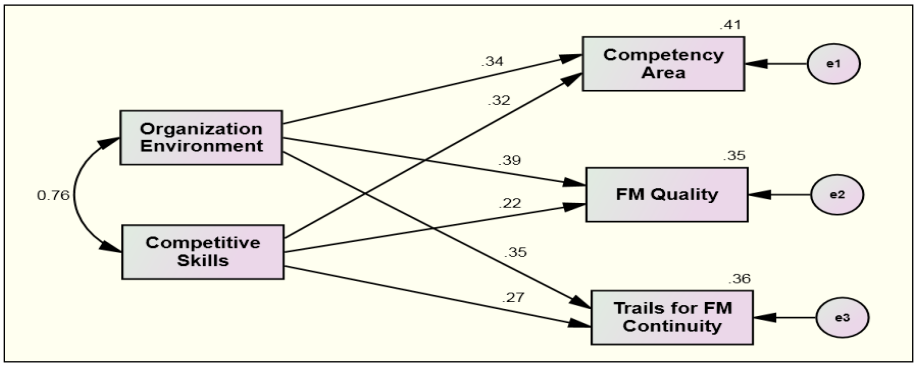

Figure 3. Structural Model 2 with Standardized Estimates

The second structural model (Figure 3) tested the regression effects of Organisation Environment and Competitive Skills on FM Competency Areas, FM Quality and Trails for FM Continuity. The R^2 values for the three regressions in the second structural model ranged between 0.35 and 0.41.

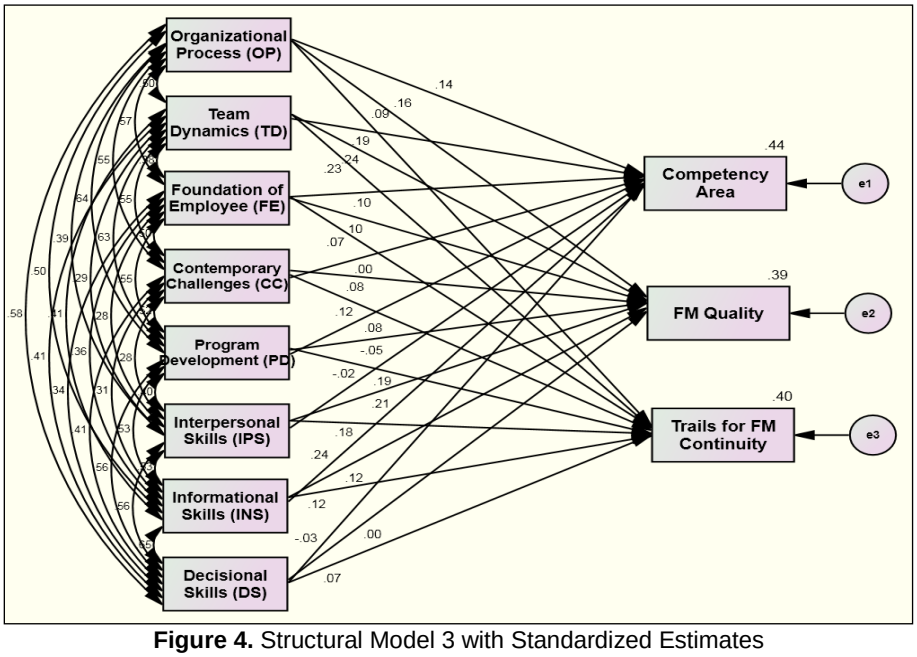

Figure 4. Structural Model 3 with Standardized Estimates

The third structural model (Figure 4) tested the regression effects of Organisational Process, Team Dynamics, Foundation of Employee, Contemporary Challenges, Program Development, Interpersonal Skills, Informational Skills and Decisional Skills on FM Competency Areas, FM Quality and Trails for FM Continuity. The R^2 values for the three regressions in structural model 3 ranged from 0.39 to 0.44.

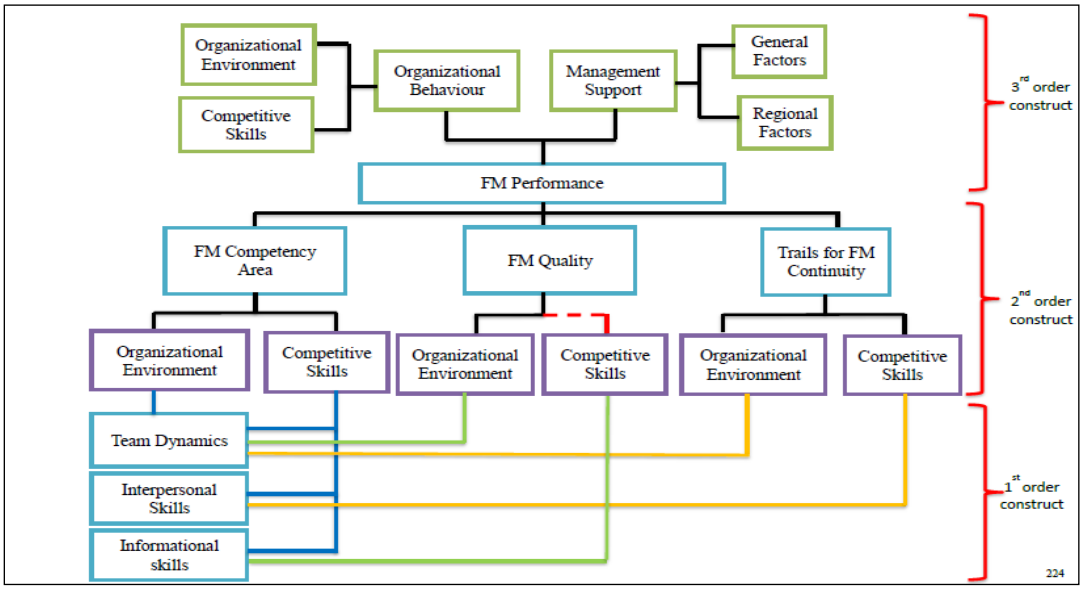

Figure 5. The Facilities Management Transformation Strategies in Malaysia

The findings from the survey questionnaire indicated that FM performance and Organisational Behaviour had a direct regression in both positive and negative ways. This focuses on both supported and non-statistically supported hypotheses. The variables of Organisational Behaviour and Management Support significantly integrated within the Facilities Management Performance to enable the FM field to be more effective and efficient. The first order construct and second order construct variables were found to be statistically significant with FM Performance. Meanwhile, for the first order construct, eight (8) important OB variables were identified, which are Organisational Process, Team Dynamics, Foundation of Employees, Contemporary Challenges, Program Development, Interpersonal Skills, Informational Skills, Decisional Skills. Meanwhile, Team Dynamics, Interpersonal Skills and Informational Skills were identified to be statistically significant and to have a positive influence on FM Competency Areas, FM Quality and FM Continuity. Other variables were also equally important to create a positive setting in the FM field, but they were not statistically significant in supporting the construction of transformation framework. Figure 5 shows the factors that was identified through SEM and this enable to create the framework which act as a tool for the FM industry to increase their level of performance by upgrading their skills and knowledge. This framework was formed to facilitate the business environment and to achieve the FM continuity in Malaysia for future needs.

CONCLUSION AND WAY FORWARD

This paper presents the results on SEM to develop the FM transformation framework for future and to improve the FM field in Malaysia to add value to the industry for competitive advantage. Prior to this, the transformation framework is significant to close the gaps between the strategic level and the operational level that will affect the corporate knowledge and business outcomes (Maszuwita, 2017). Hence, FM managers should focus on soft skills in order to be competent within global FM companies for long term development and act as an instrument to achieve higher competency levels in managing their FM business. It is also

important for FM managers to increase the level of Customer Satisfaction Index for business success and for continuous improvement.

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A CONCEPTUAL FRAMEWORK FOR HEALTHY CONSTRUCTION WORKPLACE: A LITERATURE REVIEW

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Abstract
The construction industry is one of the most significant contributors to the economic development of the country, yet it is also one of the highest risk industries. Construction workers are exposed to various health hazards in term of environmental, physical and technical factors throughout the construction process. Therefore, providing a healthy workplace for the construction industry is very crucial to ensure that absenteeism decrease, increase engagement, improve productivity, and it will affect the bottom line of the organisation. The objective of this paper is to develop a conceptual framework of healthy construction workplace. In light of this, a comprehensive desktop analysis was conducted through a total of 34 academic papers to identify robust construction workplace criterion. Findings show that most researchers and practitioners agree the three main principles, which are healthy practices, physical work environment and organisation culture able to influence the employee's health in the construction workplace. This framework helps the employer to be more committed and responsible for combating health issues and provide a healthy work environment for the employee.

Keywords: *Framework; healthy construction workplace; healthy practice, physical work environment; organisational culture; safety and healthy; workplace.*

INTRODUCTION

The construction industry contributes to economic development and growth, which has a definite increase from year to year. Interestingly, it has recorded a bad reputation as a highly hazardous industry due to the high fatality rates. A report from the Department of Occupational Safety and Health (DOSH), recorded 169 deaths and 3,911 accidents in the construction sector for 2018 (Babulal, 2020). Additionally, there are higher rates of musculoskeletal injuries and disorders reported among the construction workers (Lop et al., 2017).

Burton (2010) stated that health issues in the construction industry are not always and immediately visible. Still, it has the same devastating impact as accidents and injuries, sometimes causing protracted and long-term health problems. The unique nature of the construction process and development itself has exposed the workers to a dirty, noisy environment with lack of ventilation and lighting, handling and transporting materials with repetitive movements, overhead works, working with chemical and explosives, and adverse climatic conditions for extended periods (Uher and Ritchie, 1998; Eaves et al., 2016). These will lead to musculoskeletal disorders, hearing loss, respiratory and breathing problems, skin diseases, hand-arm vibration syndrome and occupational stress due to work pressures, workload, the risky nature of the job, job insecurity (Weeks, 2011) makes the situation worse. Besides, psychological ill-health among construction workers become familiar with high rates of smoking, alcohol and drug abuse.

The healthy construction workplace approach helps employers to improve employees' health in the workplace. Some of the researchers agreed that healthy people are less probable to be absent from work through illness, able to cope with stress, less likely to suffer from musculoskeletal injuries, and generally display more evidence of job satisfaction (Chu et al., 2000 & O'Donnell et al., 2019). Therefore, this paper aimed to develop a framework for healthy construction workplace to promote a healthy culture among the construction workers. Ultimately the goal is that workers stay healthy and more productive to produce a high-quality product.

HEALTHY CONSTRUCTION WORKPLACE

Overview of Healthy Construction Workplace

The construction industry has a unique character that is different from other industry; hence, it is an industry that is well acknowledged by the nation and the economy. The government regulates this industry with dedicated legislation as it is a complex industry that carries the most hazards and risks along the process. Some institutions focus on delivering a high standard of construction and on ensuring the industry promote health and safety standard accordingly, which includes the Department of Safety and Health, Chartered Institute of Building (CIOB) to name a few. The fundamental legislations are the Occupational Health and Safety Act 1994, and Factories and Machineries Act 1967.

The OSHA 1994 aims to ensure safety, health and welfare of all his employees at work, and the duties include to:

a) provide and maintain safe plant and systems of work at the workplace;
b) ensuring safety and health in connection with the use or operation, handling, storage and transport of plant and substances;
c) provide the necessary information, instruction, training and supervision to ensure the safety and health of employees;
d) maintain the workplace in a safe and healthy condition, reliable means of access to and egress from the workplace; and
e) provide and maintain a safe and healthy working environment, facilities for the welfare of the employees.

The FMA 1967 covers safety matters (concrete work, roof repair, catch platforms, chutes, safety belts, ladders, scaffolds, demolition, blasting, power tools) in the construction industry. However, other elements that are not covered by the legislation are the psychological and social problem and the safety culture that is vital in the industry as a whole. Research in regard to occupational health hazards and psychosocial issues in construction was small compared to the safety management process. Most researchers studied occupation health hazards in the construction industry are from different perceptions and using various tools and methods.

Definition of Healthy Workplaces

There are many definitions of healthy workplaces from various perspectives, and the development of workplaces is continuously changing in technology, concept and needs. The healthy workplace was defined by Grawitch et al. (2006, 2007) as a workplace that

implements robust programs or practices to promote employee health and wellbeing as well as organisational effectiveness. This approach is not only for the employee's physical health but also for their mental health and overall wellbeing.

Besides, according to Neira (2010), WHO Regional Office for the Western Pacific defines a healthy workplace as a place where everyone works together to achieve an agreed vision for the health and wellbeing of workers and the surrounding community with physical, psychological, social and organisational conditions that protect and promote health and safety. Under these definitions, healthy workplaces are more focus on the physical work environment, including health practices, factors, psychosocial factors and organisational culture, which can have a significant effect on employee health.

Healthy Construction Workplace

Healthy construction workplace is a holistic concept that covers the internal (organisation), external (the workplace and nature of construction), and culture (shared believe) amongst the workers and the organisation. Hence, this concept must be applied to promote healthy construction workplace. The degree of health hazards in the construction sites varies between trades and depends on the workers' level of experience and knowledge to handle the tasks. For instance, workers carrying out finishing work or painters exposed to the chemical substances that lead to asthma, headache, and in some cases may result in death. Therefore, providing healthy workplaces is the best approach to prevent a negative impact on the health of the employee in a construction site (Uher and Ritchie, 1998).

The Health and Safety Ontario (2011) stated that there are three criteria of a healthy workplace, namely the physical work environment, healthy practice and organisational culture which helps to implement a healthy culture in the construction workplace. A healthy construction workplace is achievable if the employer plays a vital role to provide a safe working environment and prevent potential risk to health. All this can support healthy culture in construction site and change the behaviours of workers to give awareness about the importance of health (Health and Safety Ontario, 2011) by implementing health promotion program, education and health protection principle.

O'Donnell (2017) indicated that a meta-analysis of 22 health promotion programs that had returned on investment (ROI) of 3.27% in medical cost savings and 2.73% in absenteeism reduction reported annual budgets that averaged $144 per person and $132 per person (2009 dollars) respectively. Thus, active participation, both employee and employer on health promotion is very crucial as it focused on both the business and the individual employee.

Moreover, the issue of Malaysia's massive reliance on low-skilled foreign labour is not new; however, so far, moderate progress in alleviating the situation (Kok, 2018). Hence, to implement an effective intervention for an ergonomic risk factor in construction, education, awareness program and training. Due to the technology and ever-changing world, training is essential to construction workers to upgrade their skills and help to recognise early symptoms of any potential occupational disease.

The changing nature of the construction workplace also results in potentially hazardous situations and further increase the health risks of workers (OSHA, 2006). Thus, principal

contractors and employers are responsible for ensuring adequate welfare facilities, personnel protection equipment (PPE), and general health and safety monitoring (Department of Health State Victoria, 2011).

Burton (2008) described that the organisational culture consists of the attitudes, values and beliefs in the workplace that affect the mental and physical wellbeing of employees. For instance, respect, appreciation, commitment to balanced workloads and job, employee involvement and support for work-life harmony.

Four significant factors namely, work overload (64.1%), pressure (59.9%), conflict of demand (52.2%) and a short constraint of time to accomplish tasks (59.7%) obtained from a survey by the Charted Institute of Building (CIOB) (Leka et al., 2005).

Several factors that trigger work-related stress including work factor (such as excessive hours, unreasonable demand, or inflexible work arrangements), organisational practices (weak lines of communication, poor leadership, etc.), workplace change (high staff turnover) and relationships at work (bullying) (World Health Organisation, 2000). Leka, et al. (2005) stated that there are numerous ways to reduce organisational stress and improve health in the workplace by providing clear organisation structure and practices, appropriate selection, training and staff development, practices two-way communication and show respect for employees.

METHODOLOGY

In line with the objective of this paper, a comprehensive desktop search conducted under the "title/abstract/keyword" field from several dominant multi-disciplinary databases including Springer, Science Direct, Researchgate and Emerald in the year between 1998 and 2019. Numerous studies have investigated the healthy workplace from different perspectives. Hence, this research will focus on three main criteria of a healthy workplace, namely healthy practices, physical work environment and organisational culture, which was useful for describing the general focus of intervention research;

1. Healthy practices are the program to be implemented in the company, which aim to promote a healthy culture and awareness among construction workers.
2. Physical work environment highlights the health hazards exposes to the construction workers and how to control the risks.
3. Organisational culture aims to increase organisational commitment, employees' involvement and offer work-life balance.

FINDINGS AND DISCUSSION

The framework used three main criteria that cover the healthy practice, the work environment, and organisational culture. These three central criteria cross over one another and each sphere addressed in an integrated, comprehensive manner (Health and Safety Ontario, 2011) to achieve a healthy workplace as shown in Figure 1.

Figure 1. The criterion of Healthy Construction Workplace

Healthy Practice

Healthy practices are addressing ways to help employees with lifestyle issues by promoting healthy policies and programs shown. The Isosceles Group (2017) highlighted that workplace health promotion programs are efforts put forth by employers to improve the health of employees which generally fall into three categories: primary prevention to prevent illness or disease from occurring such as physical activity challenges, stress management programs, and anti-smoking campaigns; secondary prevention focusing on high-risk employees such as weight loss classes, smoking cessation telephone quitlines, and improving access to medication; and tertiary prevention, sometimes referred to as disease management, aimed at those employees with an existing condition. Health screening in the work setting is the best practices in healthy practices to detect early signs of illness and precautionary measures taken to prevent permanent health damage (Burton, 2008; Department of Health State Victoria, 2011).

The Malaysian construction industry has highly relied on foreign workers. Most of them are not well-trained and fewer construction experiences. Therefore, promoting occupational health and safety (OSH) education and training program lead to safer practices among employees (Burton, 2008) and providing more health information (Goetzel et al., 2008). Dorji and Hadikusumo (2006) also added that training program should be promoted to the construction workers to upgrade their skills but also focusing on how to use the devices correctly, learning the technique can prevent health issues.

Policies and programs needed to address the possible causes, such as health protection principle (OSHA, 2006). According to Leigh (2011), this can help employers avoid the direct costs that result from workplace incidents which the indirect loss estimated to be at least 2.7 times the direct costs. In practice, the core elements of the recommended practices for health policies are hazard identification, risk assessment, prevention, and personal protective equipment (Health and Safety Ontario, 2011; OSHA, 2006; Dorgan, 2006; Occupational Safety and Health Administration, 2016). These policies provide guidelines and benchmarking to the organisation as well as generate awareness to the workers.

Table 1. Matrix of Healthy Practice Criterion from Various Literature

Criteria	Sub-Criteria	Determinants	OSHA (2006)	Burton (2008)	Iso. (2017)	Goetzel et al., (2008)	Dorji (2006)	Leigh (2011)	Dorgan (2008)
Healthy Practice	Health Promotion	Healthy lifestyle program		✓	✓				
		Anti-smoking campaign		✓	✓				
		On-site screening		✓	✓				
		Stress management		✓	✓				
		Employees participation		✓	✓				
	Education	Awareness program		✓		✓	✓		
		Training		✓		✓	✓		
	Health Policies and Programs	Hazard identification	✓				✓	✓	✓
		Risk assessment	✓				✓	✓	✓
		Prevention	✓		✓		✓		✓
		Personal protective equipment	✓		✓		✓		✓

Physical Work Environment

The environment includes the surroundings, conditions, physical, etc. or all of which can influence the health status of workers. Construction workers exposed to heat, cold, noise, chemical, and vibration that can cause a range of illnesses. Various means controlled the physical risk factors including prohibiting construction activity by time and date in city zones for noise control; engineering modifies the equipment to minimise the exposure of chemical and vibration, and personal protective equipment (Eaton, 2000; Chinniah et al., 2017). Chinniah et al. (2017) also added that workers who are responsible works in limited space such confined site exposed to the atmospheric hazards where it affects to the air quality and present immediate hazards to health or life. OSHA (2012) emphasised confined space entry permit or certification are compulsory to trained employees to understand the procedure for confined space entry; know the hazards of the specific space and understand how to use entry and rescue equipment.

Providing excellent welfare facilities on site include the provision of drinking water, washing, sanitary and changing accommodation, restrooms and shelter, facilities for preparing and eating meals, temporary housing, help to improve workers' health (Health and Safety Executive, 2006). Construction work required more than 30 days and involved more than 500 person-days of work. By referring to the Health and Safety Executive (2006), adequate welfare facilities must be provided for employees so far as is reasonably practicable while they are at work even though in a short period. Hence, the facilities provided to the workers must be reasonable in terms of time, trouble, cost, and physical difficulty.

Lighting plays an essential role in the health and safety of everyone using the workplace as it is the quicker and easier way to identify hazards and more efficiently to avoid. Health and Safety Executive Health and Safety Executive (2006) agreed that all parts of the site need to be adequately light by natural or artificial means whenever work is going on, mainly when working at night. Site lighting is always necessary for those areas short of natural light such

as shafts and enclosed stairways. Thus, artificial lighting uses to avoid deep shadows; these may screen hazards which would be evident in a good light. To prevent glare, mounting of views should be as high as practicable, and lights so that workers do not have to work in their own shadow (Health and Safety Executive, 2006). Providing the correct level of lighting in a construction site can avoid visual fatigue, migraine and headaches and also, help workers to carry out the task safely and proficiently.

Table 2. Matrix of Physical Work Criterion from Various Literature

Criteria	Sub-Criteria	Determinants	Int. Labour Org. (2009)	Eaton (2000)	Chinniah et al. (2017)	Health Safety Exec. (2006)	Akinci et al. (2000)
Physical Work Environment	Temperature	Preventive management program (technology, administrative controls, PPE)	✓	✓			
	Noise		✓	✓			
	Chemical		✓	✓			
	Vibration		✓	✓			
	Space	Procedure of confined space entry permits/certification	✓		✓		✓
	Welfare Facilities	Adequate and appropriate facilities for employees	✓			✓	
	Lighting	Natural lighting	✓			✓	
		Artificial lighting	✓			✓	

Organisational Culture

Organisational culture is psychosocial risk factors that affect the mental and physical wellbeing of employees, especially the nature of the construction process itself, which involves a large number of stakeholders whose shared responsibilities. In this respect, the communication gap between them was the main reason for the majority of the arguments, as shown in Table 3. Rameezdeen and Gunarathna (2005) stated the importance of teamwork; encourage discussions, participative decision-making, and open communication are drivers to a comfortable working environment. Feelings associated with fairness include satisfaction, calmness, enthusiasm and happiness can create a healthy environment in the organisation. For example, job rotation among construction workers is possible, with concern that often, young workers carry an imbalanced amount of heavy work on a site (Rwamamara, 2005). Therefore, this technique can help management to allocate the work tasks more equably and fairly, as well as can reduce the workload for all workers. A sense of fairness in the workplace is related to trust, which is the key to good employer-employee relationships, high morale and productivity.

Faculty of Public Healthy (2006) highlighted supervisors must be a good role model for employees by demonstrating good work habits, give positive feedback to employees, practices two-way communication, and show respect for employees. Thus, the strong negative feelings, such as anger, depression, demoralisation and anxiety, will be eliminated in the organisation.

Table 3. Matrix of Organisational Culture Criterion from Various Literature

Criteria	Sub-Criteria	Determinants	Burton (2008)	Rameezdeen & Gunarathan (2012)	Rwamamara (2005)	Fac. of Public Health (2006)
Organisational Culture	Communication	Two-way communication	✓	✓	✓	✓
		Open communication	✓	✓	✓	✓
	Participation	Active participation both employer and employee	✓		✓	
	Teamwork	Encourage discussion	✓		✓	✓
	Flexible Work	Work-life balance	✓	✓	✓	
	Socialising	High commitment	✓	✓	✓	
	Fairness	Satisfaction, trust, calmness, happiness	✓	✓	✓	

Based on Table 1, 2 and 3 shows that researchers have the same perception on the criteria of healthy construction workplace where health policies and the program recorded as the most selected factors in the implementation of the robust approach in the construction workplace. Identify the health hazards associated with particular activities or tasks are necessary through risk assessment to evaluate the effects of the possible hazard; thus, the suitable action needed to reduce them ultimately.

Framework of Healthy Construction Workplace

From the three main criteria, sixteen sub-criteria have been derived from the findings to identify the determinants of healthy construction workplace, as shown in Figure 2.

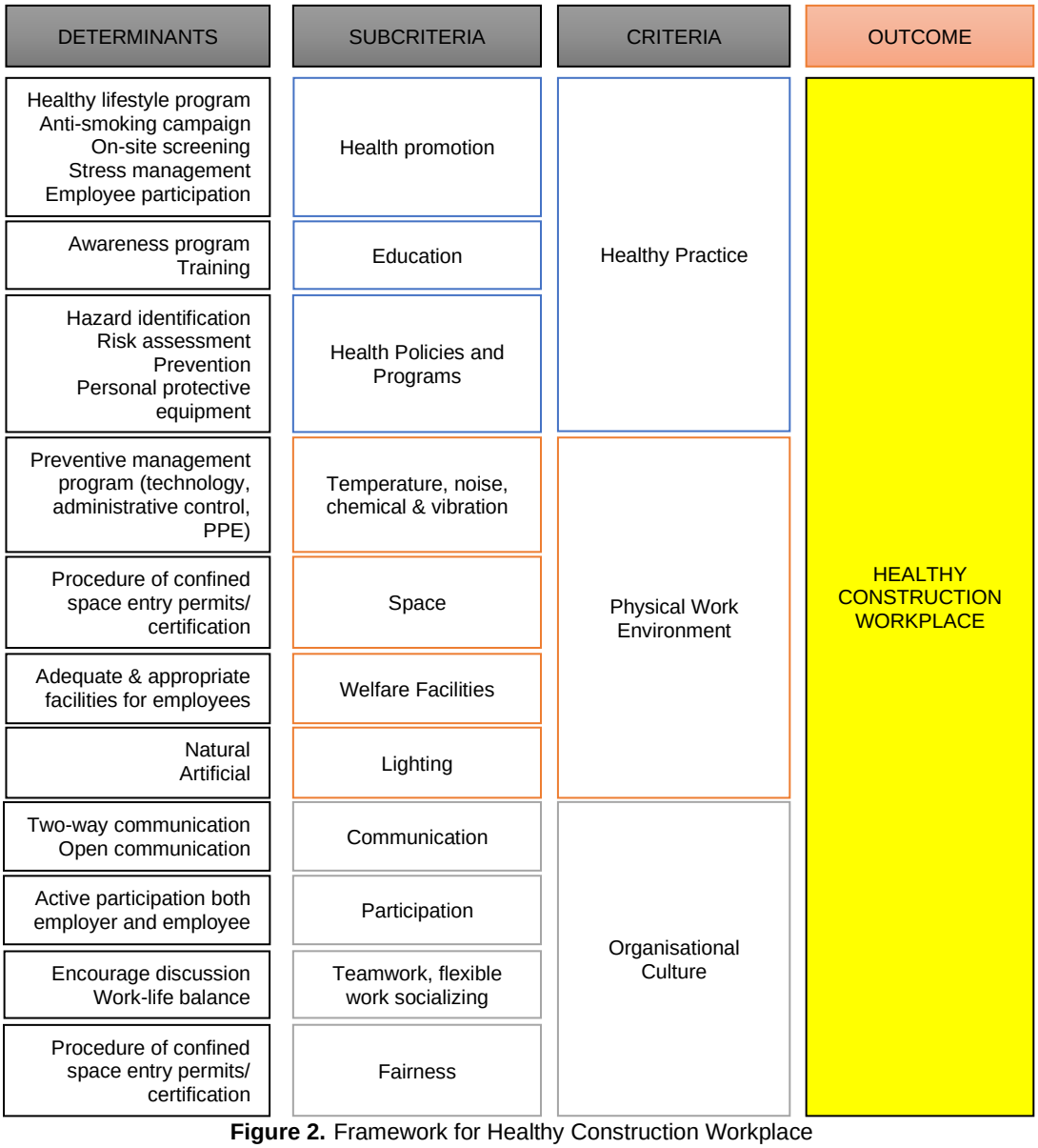

Figure 2. Framework for Healthy Construction Workplace

CONCLUSION

In conclusion, a healthy work environment will produce high performance, productivity and employee satisfaction. This paper sought to develop a framework for healthy construction workplace. This framework is crucial to assist the construction organisation in improving the working environment towards a safe and healthy workplace. This paper has identified 22 determinants of criteria related to the healthy workplace in the construction industry from various authors. Further, from that, the twenty-two (22) lists have been classified under three (3) the main criterion which are healthy practices, physical work environment and organisational culture. This research is a desktop analysis; thus, sampling methods could be the major obstacle in verifying the framework. There is still a gap that needs to fill in developing a well-structured framework with proper interventions that able to help

construction employers to tackle health issues among workers in the workplace. Future studies need to verify this framework as the nature of the work environment will continuously change and required to identify additional criteria for further establish healthy workplace.

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PREDICTORS OF SPATIAL VISUALIZATION ABILITY (SVA) IN CONSTRUCTION AND THE QUANTIFICATION COURSE ACHIEVEMENTS: A CONCEPTUAL ANALYSIS

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Abstract
Construction quantification (measurement of construction works and costing of building works) is viewed as one of the most essential skills of a quantity surveyor. The problem-solving ability is the necessary skill that a quantity surveying professional have to possess as it will determine the potentials of the quantity surveyor to complete their principal task. However, the academic performance among students who had passed the course is inconsistent. Spatial visualization ability (SVA) has been argued to have practical implication in various technical fields. In this paper, this research aims to establish a framework of a study on the predictors of the spatial visualization ability achievement scores and the quantification course achievement among Malaysian public university students in Quantity Surveying Programme. To develop the research framework, a depth analysis to one of the cognitive ability aspects (spatial visualization) was broadly conducted. In addition, SVA skill also observed in the context of cognitive development such as gender differences, cultural aspects, aptitude and experiences (demographics background criteria). In order to identify direct and/or indirect links of the spatial visualization ability and quantification course achievements, this research was steered through the critical review analysis from related former research and existing framework. The findings summarise relevant key factors of variables with regard to SVA that can be considered as a basis to outline and impose an effective teaching and learning adaptation framework for this academic disciplines. Theoretically, considering students' differences in cognitive ability and demographics background could allow in acquiring better teaching and learning approach, adaptation system identification and accomplish a better academic outcome.

Keywords: *Achievement; cognitive; learning; quantification; spatial visualization.*

INTRODUCTION

Construction quantification and costing of building works (technical estimation process) are known as core subject taught in the Quantity Surveying Programme (Royal Institution of Chartered Surveyors (RICS), 2017). It is known as the most important course of studies (Abdul Aziz, 2003; Rashid, 2002a; Rashid, 2002b), and the highest level of knowledge (employers' expectations) that needs to be acquired by quantity surveying graduates (Yogeshwaran et al., 2018). To experience successful future both in teaching and learning phase (construction quantification achievement), it is very important to know the early warning signs that put students at risk for having certain difficulties in performing a complicated construction quantification task (Hodgson et al., 2008). Therefore, in order to promote better achievement in construction quantification among quantity surveying students (construction quantification proficiency), it is crucial to identify the relevant key factors (warning signs) with regard to the individual students' capabilities and difficulties such as low and high spatial visualization ability (SVA). According to Hodgson et al. (2008), this requirement of capability eventually affects the achievement of each quantity surveying student. The author claimed that, such warning signs and early identification of SVA required during the process of reading and translating construction plans can pave the most efficient way for students to get the support that they need during teaching and learning phase.

Generally, SVA is known as the student's ability to read and interpret the construction plan (Golledge & Stimson, 1997). The ability to see the two-dimensional (2D) representation details in the construction plans and mentally transforming it into three-dimensional (3D) interpretation is a benefits for the student because they have the visualization ability that allow them to view all the details shown in the plans comprehensively (Osman et al., 2015). In general, to obtain quantities of building items from the 2D plans during the construction quantification process, the learning and thinking process requires students to have the mental strength capabilities (Fortune & Skitmore, 1994). However, it should be noted that the student intelligence varies from individual to individual (Alias et al., 2002a). Thus, this early diagnosis of student's reaction differences is very important to understand students' learning conditions (key factors) that contribute to the construction quantification achievement of each student. Getting to know key factors from the beginning would help to design the most effective instructional methodology or technology that best fit each student's needs in performing complicated tasks (Hodgson et al., 2008; Peddle, 2000).

Previously, there have been many studies carried out about learning and performance in various technical fields related to students' spatial visualization ability (SVA) such as engineering (Eliot & Smith, 1983; Hsi et al., 1997; Miller & Bertoline, 1991; Sorby & Baartmans, 2000), chemistry (Bodner & Guay, 1997), engineering drawing (Potter & Van Der Merwe, 2001), medical surgery (Eyal & Tendick, 2001), and computer animation (Din & Mokhtar, 2013; Huk et al., 2003; Rozimah, 2014). In such scenario, previous studies about SVA skill also observed in the context of cognitive development such as gender differences, cultural aspects, aptitude and experiences (Robichaux & Guarino, 2000; Alias et al., 2002a). However, the generalisation of the previous findings to other technical fields was questionable as evidence has shown no consistent findings (direct and or indirect significant relations of the spatial visualization ability and course achievements). In addition, previous research has focused on a different context, group, sample or population (Creswell, 2014). Therefore, before it is theoretically and empirically proved, such findings cannot be entirely accepted as a basis for generalisation, especially in different technical field with different programme structure and individual conditions of learning. To help educators connect with the students, further related studies need to be explored to improve the foundation of understanding about issues that surrounded the possible research questions on the effects of different cognitive ability, cognitive style, learning style and teaching approach toward students' achievement (Entwistle & Tait, 1990; Hou, 2009). Apparently, each student is unique and perform diverse learning abilities, styles and preferences (Brown, 2003; Pithers, 2002; Rozimah, 2014; Yi, 2012). Although learning and some aspects of performance criteria identification framework were described in the past research, it has a limitation in assessing other areas and fields (Brown, 2003; Entwistle & Tait, 1990; Hou, 2009; Lizzio et al., 2002; Mackinlay & Barney, 2010; Pithers, 2002; Rozimah, 2014; Yi, 2012). Apart from that, previous research is not specifically focused on developing teaching and learning framework for the construction quantification technical estimation course that can be suited the quantity surveying programme structure (different scope of work and skill requirements) and conditions of learning in terms of different students' personality types (gender, cultural aspects, aptitude and experiences aspects) and cognitive abilities (low and high visualization).

In this study, some key indications and predictors on the relationship between construction quantification achievement and variations of student characteristics (cognitive ability and demographics background interest) among quantity surveying students need to be

further explored. It is for the purpose of finding the most effective teaching and learning approaches (Mackinlay & Barney, 2010), and getting better academic outcomes (Lizzio et al., 2002). It should be noted that, clarifying the key factors involved in this study is very crucial before proceeding the research to the subsequent phase of data collection through research instruments such as questionnaires, interview and tests. In addition, the initial findings obtained from the literature analysis is crucial to guide future direction of the present study.

RESEARCH METHODOLOGY

Principally, there are several issues related to students' construction quantification skills that need to be further discussed such as the learning and performance criteria identification framework. Specifically, the study was carried out to establish the known extent of the construction quantification problem-solving ability (essential qualities for the construction quantification skills) and student's achievement issue. It is important to identify the key factors which may affect students' achievement in construction quantification course. In tackling the problem, this study was steered to review the relevant variables (cognitive ability and demographics background) that previously reported in several former principal articles related to the learning and performance framework studies.

RESULT AND DISCUSSION

In dealing with the key factors that contribute to the construction quantification achievement, this study, however emphasised on two sets of variables only (key factors) such as the cognitive ability (Peck et al., 2012; Velez et al., 2005), and demographics background (Ziemkiewicz et al., 2012). These two key factors are discussed to address the relationship between the students' specific characteristics in terms of mental ability strength (cognitive level differences) and demographics background (gender, cultural aspects, aptitude and experiences aspects differences). Essentially, it is beneficial towards clarifying the genuine characteristics (personal and situational factors) of students' differences, especially when it comes to visualizing and calculating the approximate cost of the whole project from the construction plans (technical knowledge of quantity surveying). Apparently, these key factors were identified as relevant predictors to outline an effective ways' in teaching and learning strategy for this academic disciplines. In dealing with the related key factors and student's achievement issue concerned with the students' construction quantification learning outcomes, the following discussions may provide an overview and a better understanding about the research needs in which this learning programme is engaged. In this initial study, a critical look at the quantity surveying education, dominant aspects of quantity surveying education and technical knowledge of quantity surveying (anticipated skill requirements) help to explore the predictor variables and clarify the quality standards of the construction quantification achievements that relate with educational outcome, learning process and performance of the students.

Quantity Surveying Education

Generally, in quantity surveying curriculum, there are three different grouped course structure such as quantity surveying courses (core and non-core subjects), university courses (English, Islamic or moral studies and entrepreneurship) and elective courses (Co-curriculum). These are the important elements to set up the basic understanding of the quantity surveying programme of studies (Academic Affair, 2016). In quantity surveying education,

construction quantification (measurement of construction works and costing of building works) is known as one of the main technical knowledge in the field of quantity surveying (Academic Affair, 2016; Ali et al., 2016; Fortune & Skitmore, 1993; Fortune & Skitmore, 1994; Hodgson et al., 2008; McDonnell, 2010; Zakaria et al., 2006). Essentially, it is one of the fundamental subjects taught in the quantity surveying programme for the benefit of core competencies of quantity surveying professionals' special requirements that typically required by employer (Zakaria et al., 2006). In basic terms, for the value of the profession, it is known as the most important course of studies that need to be mastered by the professional graduates. Apart from that, in fulfilling the programme educational objectives, needs and expectations, in-depth technical knowledge is one of the most important cognitive aspects that need to be acquired by professional expertise in the discipline of quantity surveying (Academic Affair, 2016).

Dominant Aspects of Quantity Surveying Education

Before going further into this study, it is important to fully understand the dominant aspects of quantity surveying education that highlight concepts, principles and methods (technical knowledge and relevant practices) that support the programme learning outcomes. Moreover, it is also crucial to define and describe the requirements, appropriate discipline standards and best practices for the field.

In construction quantification area of study (core subject), spatial visualization ability (SVA) is one of the strong influences on the development of the technical knowledge and ability of a quantity surveying student (Fortune & Skitmore, 1993; Fortune & Skitmore, 1994; McDonnell, 2010). The impact of SVA is critical because it may affect a student, positively or negatively in other aspects such as cognitive styles, learning styles, learning strategies and achievements (Hodgson et al., 2008). In order to sustain a better programme learning outcome (Hunter, 1986; Walberg & Tsai, 1983), previous findings from other fields have shown that it is important to fully aware of all the potential factors involved (Cassidy, 2004). In many aspects, the potential factors such as different students' ability and profile criteria may provide a theoretical framework and become a role model in addressing the technical knowledge (construction quantification approach and problem-solving ability) and relevant practice's achievement issue necessary for the current research (see Table 1).

In this particular study, SVA development is crucial because it is an extension to cognitive ability and recognised as one of the supports thinking tools as well as problem solving aids (Ziemkiewicz et al., 2012). In reality, there are two types of students (SVA development). As detailed in Table 1, the findings demonstrated that some of the students were gifted with high spatial visualization. Whereas some of them experienced greater difficulties to deal with the visual task (low spatial visualization). According to previous research, to differentiate the SVA level, it is crucial to identify the student's action of thinking for example how quickly a person learns, do and react (Hunter, 1986; Yukhina, 2007). Essentially, lacking SVA may influence students' performance in quantification course because the task demands imagination skills (Fortune & Skitmore, 1994). Thus, it is an advantage for the student to be able to visualize (Osman et al., 2015). Basically, the cognitive ability is known as one of the component aspects in human intelligence (Alias et al., 2002a; Ali & Mokhtar, 2014; Park & Yoon, 2012), and the ability (a person's genetic potential) varies from one person to another (Hunter, 1986).

Table 1. Important points and relevant key factors identified from previous primary articles

Author/Year	Description	Key Factors
Peck et al. (2012) Velez et al. (2005)	Known as one of the cognitive ability factors	Individual Differences • Cognitive Ability • Spatial Visualization Ability (High and Low)
Ziemkiewicz et al. (2012)	Problem solving aids, extension to cognitive ability and support thinking tools (spatial visualization development)	
Alias et al. (2002a) Ali and Mokhtar (2014) Park and Yoon (2012)	One of the component aspects in human intelligence	
Hunter (1986) Yukhina (2007)	How quickly a person learns, do and react	
Fortune and Skitmore (1994) Olkun (2003)	Imagination skills	
Arslan and Dazkir (2017) Börner et al. (2016) Galesic and Garcia-Retamero (2011) Lee et al. (2017) Osman et al. (2015)	Ability to read, comprehend and interpret (mental visualization)	
Ben-Chaim et al. (1986) Golledge and Stimson (1997) McGee (1979)	Sees things in the mind's eye (2D & 3D)	
Yukhina (2007)	Deal with the visual, semantic or numerical stimuli	
Ziemkiewicz et al. (2012)	History backgrounds, personalities and prior experience gain on a routine basis	Demographics Background
Alias et al. (2002b)	Cultural environment exposure and prior experience development	
Ali et al. (2012) Bishop (1980)	Participation in musical activities, engage in certain sports and subjects, 3D representation	

Besides consideration on the aspect of individual differences such as different SVA (low and high), as shown in Table 1, this study also considers at the other demographics background factors affecting SVA such as gender, cultural aspects, aptitude and experiences aspects differences. It should be noted that, in order to promote better achievement among quantity surveying students, important points and relevant key factors identified from the previous primary articles that consider different demographics background criteria would also help to clarify the characteristics of a student (Ali et al., 2012; Alias et al., 2002b; Bishop, 1980; Ziemkiewicz et al., 2012), and learning difficulties issues such as students' diversity strengths during the learning process. In the context of demographics background, although there have been many researches done with respect to development of SVA, findings from previous research have shown no consistent findings of relationship (Robichaux & Guarino, 2000). In this study, since the research goals is to clarify the relevant key factors and subsequently propose an effective teaching and learning framework that can suit students' differences, it is crucial to explore the SVA theories in connection to human cognition abilities (McGee, 1979), and predictor variables that relate with the educational outcome, learning and performance (Walberg & Tsai, 1983).

Technical Knowledge of Quantity Surveying

According to previous research, the industry assumes graduates to have key expertise and functions (traditional) such as the ability to provide estimates during the preliminary stages of the construction procurement process, prepare Bills of Quantities (BQ) from architectural, engineering and other technical drawings, dealing with the material, workmanship and the

quantities required, evaluate tenders, prepare and analyse cost data, execute contract administration, evaluate interim payments, assess variations, claims and finalise contract accounts (Rashid, 2002b). In basic terms, there is no doubt that one of the most key skills of quantity surveyor (QS) is a technical estimation such as quantification works from several different kinds of construction plans (Abdul Aziz, 2003; Rashid, 2002a; Rashid, 2002b). To do so they must be able to mentally visualize in 3-dimensional (3D) form, the 2-dimensional (2D) information presented on those construction plans. By understanding the various building details sketches, orthographic drawings, visualizing in 3-dimensions (3D) through isometrics, oblique and perspective drawings, it is believed that students could improve the spatial visualization ability (SVA) in time and able to abstract the amount of information from the drawing within a short time and with minimum error. In such scenario, previous studies observed mental visualization as very critical aspects in spatial ability (Arslan & Dazkir, 2017; Ben-Chaim et al., 1986; Börner et al., 2016; Galesic & Garcia-Retamero, 2011; Lee et al., 2017; McGee, 1979). According to Wang et al. (2007), in certain scientific and engineering activities, the natural ability to visualize is also important.

Essentially, during the process of quantification of quantities of building items from technical drawings (taking-off), it is important for potential quantity surveyor (QS) to develop this SVA and thereafter improving the precision of Bills of Quantities (BQ) presentations. The ability of the students to deal with the technical plans' interpretations in various form (reading and translating drawing) during the taking-off process will greatly assist them to understand the extent of works involved in a particular building design, the exactness of the shape, size, dimensions and details of building (Fortune & Skitmore, 1994; Kymmel, 2008; Olkun, 2003; Osman et al., 2015). According to Alias et al. (2002a), this multi-faceted ability or spatial visualization ability (SVA) helps to conceptualise links between reality and the abstract model (technical plan) of that reality. In order to develop the SVA, it is important for the potential QS to be trained at tertiary level as students are predictable to be a qualified QS with the anticipated skill requirements after their graduated (Oladotun & Edosa, 2016; Zakaria et al., 2006). These previous studies by Malaysian academics are not alone in their beliefs because the finding is similar to the study carried out by previous researchers (Ali et al., 2016; Cheng, 2008; Mohd Derus et al., 2009).

Having identified the effect of SVA and the performance in the quantification of building quantities, recommendations to improve subject contents for the curriculum review and improve teaching techniques for the course can be implemented. Subsequently, the students' education could be focused on improving their SVA on various construction particulars sketches, 2-dimensions (2D) drawings and visualizing in 3-dimensions (3D), oblique and perspectives drawings. Besides that, prediction on the construction quantification course achievements can be made at an early stage and thereby allow necessary remedies against the SVA level (high and low). It should be noted that, many scholars shared the same opinion as they approved that cognitive ability influenced the students' achievement. Hunter (1986) also confirmed that prediction of the academic performance could be made based on students' cognitive ability as the relationship between these two variables was found to be significant. In previous literature, Merchant et al. (2013) also claimed that SVA correlate with the students' achievements. However, there was a lacking in the current education system as the present teaching framework frequently ignored the individual differences aspects. It should be noted that different student tends to approach learning differently (Novak, 2010).

To properly outline the key factors of different cognitive level (low and high SVA) and specific characteristics of students' demographics background in the learning approach strategy, the present study reviewed several pilot articles to explore the potential relationship between the key factors to the construction quantification course achievements. Specifically, the pilot articles were used as a basis to clarify whether the following aspects such as gender (Robichaux & Guarino, 2000), aptitude (Alias et al., 2002a), cultural environment (Alias et al., 2002b), spatial experiences (Robichaux & Guarino, 2000; Ziemkiewicz et al., 2012) influence the SVA and the course achievements. The literature findings obtained from the present framework studies in connection with cognitive ability, demographics background and students' academic achievement achievements was directed to confirm the independent and dependent variables involved in this particular study.

In summary, the key factor discussed here is that of relating the significant impact of the cognitive ability (SVA and demographic background factors) to construction quantification course achievements (see Table 1). To improve understanding about the study, this conceptual analysis reviewed other studies to determine what theories to be confirmed and which demographics background variables were significantly related to SVA. Findings of prior studies in connection with SVA, demographics background and academic achievements is very important because such information can suggest good indicators to guide the direction of the study. Besides, this initial study could be an early initiative in deciding the most effective teaching and learning approach framework that suitable to meet different cognitive ability students with specific characteristics.

CONCLUSION

The research described in this paper is part of an ongoing PhD research at the faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA. Essentially, in order to deal with the practical and literature gaps, this study was committed to examine the construction quantification learning and achievement issues related to student's differences factors such as cognitive ability and demographics profile influences. In providing an effective teaching and learning approach that can be adapted with the learning issues concerned to individual differences, critical literature review analysis from the precedent research and present framework has been performed. In the initial study, the prior studies' findings outline several potential criteria and variables to measure the effects of SVA on the quantification course achievements. The potential key factors were gathered to predict the performance effects. In this study, the key factors would form the foundation of effective and valuable teaching and learning adaptation framework especially for different types of learners. Ideally, such a framework should be integrated into the existing planning and decision-making process of teaching and learning in the current education programme. In addition, for the sake of a better programme learning outcomes, it would help to improve the current educational practices and designing new and the most effective teaching and learning adaptation framework.

In conclusion, in order to determine how individual students' characteristics relates to the construction quantification approach and problem-solving ability, it is important to review the relevant key factors such as cognitive ability, and demographic background. Based on the previous literature findings, it was confirmed that getting known these two initial variables is very crucial in predict job performance. It should be noted that, from the literature review, it can be seen that imagine and visualize construction details is one of the essential attributes

and qualities for the quantification skills. Many scholars agreed on the effects of spatial visualization ability (SVA) on students' achievement. Educational theorist believed that integrating cognitive factors such as spatial ability and student-specific characteristics in learning influences students' achievement as it was a great concern to enhance the achievement of students with lower spatial abilities. In addition, besides SVA, demographics background factors were also crucial to be addressed accordingly as the related factors such as gender, cultural aspects, aptitude and experiences aspects differences were also known to be the key predictors in suggesting the most specific teaching and learning adaptation strategy for different cognitive ability students.

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A CHOICE OF RESEARCH STRATEGY FOR KNOWLEDGE MANAGEMENT STUDY IN PRIVATE FINANCE INITIATIVE PROJECTS IN MALAYSIA

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Abstract
This paper focuses on the choice of a research strategy for knowledge management study in Private Finance (PFI) Projects in Malaysia. It outlines the methodology adopted for the research and presents evidence for choosing the appropriate methodology during the development of a research strategy. This paper reviews the frequency of usage among different research strategies that had been adopted by previous researchers. The strength and weaknesses of one of the highest approaches were highlighted and discussed to provide a valid reason for the choice of this research methodology. From this study, it draws out lessons about the research strategy which is quantitative methods using questionnaires as the best methods concerning the collection of data analysis as a strategy to achieve the objectives.

Keywords: *Knowledge management; private finance initiative projects; research methodology.*

BACKGROUND

Knowledge Management and PFI

Horwitch & Armacost (2002) defined KM as the creation, extraction, transformation, and storage of the correct knowledge and information to design better policy, modify action and deliver results. Mouraviev & Kakabadse (2012), further defined KM as a discipline that can be observed from several perspectives because there are a lot of fields that contribute to KM such as fields of philosophy, cognitive science, social science, management science, information science, knowledge engineering, artificial intelligence, and economics.

The concept of PFI can be defined as involving the transferring responsibility for financing, managing the fund of the project to private financing instead of the government (Farmi et al., 2011). In returns, the government needs to pay the lease that equivalent to the appropriate amount of the services to secure the profit of the investment/funding (Ismail & Yusof, 2010). The ownership of the assets and the facilities will be transfer to the government once the period of the concession is ended (Ismail & Yusof, 2010).

PFI involved a long collaborative engagement between parties involved in this procurement (Leiringer & Schweber, 2010). A collaborative working environment exists in PFI where it involves collaborative knowledge (Kamara et al., 2003). According to Edwards (2011), as shown in Figure 1, there are three elements of knowledge management in order for knowledge management to make sure knowledge management system success. People, Process and Technology are the elements that should not lack in a system. From these points, the issues in PFI are then to be related to the lack of knowledge management.

Despite the benefits that PFI bring, it also has the outfall as listed by (Kipli et al., 2016). The summary from our previous research in the paper entitled "The Missing Points of Knowledge Management in Private Finance Initiative Projects" has also outlined the need to study further on the KM in PFI as in Figure 2.

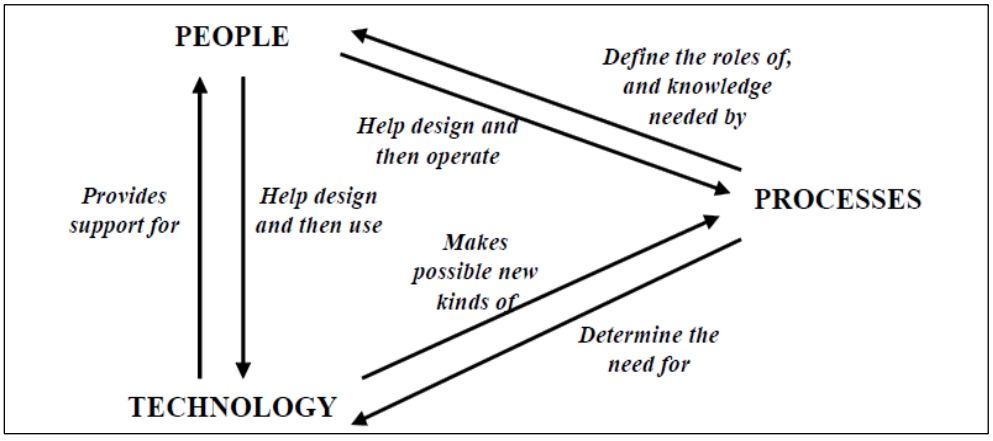

Figure 1. People, processes and technology (Edwards, 2011)

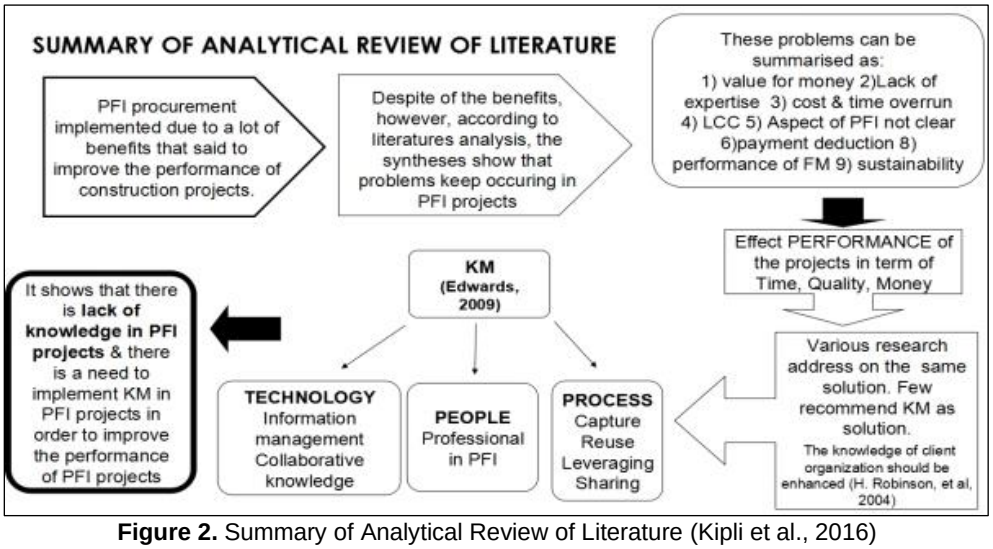

Figure 2. Summary of Analytical Review of Literature (Kipli et al., 2016)

RESEARCH METHODOLOGY

So, what are the most suitable research approach and technique to be used in the study of KM in PFI projects? A study of suitable research strategy to be adopted had been done by a few researchers before they proceed with their study (Mustapa & Mustapa, 2012; Jamshed, 2014). The analysis had been done to list of papers that had been highlighting the PFI issues.

Research Approach

Research approach can be divided into quantitative, qualitative and mixed-method approach (Cresswel, 2013); (Blessing & Chakrabarti, 2009). The qualitative method involved

in 5 different approaches which are narrative research, phenomenology, grounded theory, ethnography, and case study (Creswell, 2007). According to Newman, I. & Benz, (1998), it is difficult to represent these methods accurately as discrete entities because overlap almost always occurs. One study strategy may use another study strategy within its framework, as well as within its data collection procedures(Kumaraswamy & Chitale, 2012). For example, if an investigator uses an ethnographic strategy, the collected information might be coded numerically and analysed statistically in a hypothesis. However, an underlying assumption of the ethnographic method is that one cannot generalize; the researcher cannot begin with a purpose toward generalizability of findings and then carry out the research methods in ways that disallow generalizability (Jonker, 1944; Jakubik, 2008).

Different from the quantitative method. it appears that one goes from reviewing and defining directly to developing hypotheses and collecting data (Mota & Moreira, 2015) (Newman, I. & Benz, 1998) (Bourne & Walker, 2008). In quantitative analysis, this is called the derivation of hypotheses. These derivations may be considered qualitative analyses in simplified form. The researcher examines the literature and, based upon this process, he or she derives theoretical expectations, which become the derived hypotheses (Newman, I. & Benz, 1998). For many years positivism and quantitative methods have been in the ascendancy in construction management research (Fellows & Liu, 2003). The strength and weakness of the quantitative methods are as follows:

The strengths of the quantitative method include:

- Stating the research problem in very specific and set terms (Frankfort-Nachmias & Nachmias, 1992);
- Clearly and precisely specifying both the independent and the dependent variables under investigation;
- Following firmly the original set of research goals, arriving at more objective conclusions, testing hypothesis, determining the issues of causality;
- Achieving high levels of reliability of gathered data due to controlled observations, laboratory experiments, mass surveys, or other forms of research manipulations (Balsley, 1970);
- Eliminating or minimizing subjectivity of judgment (Kealey & Protheroe, 1996);
- Allowing for longitudinal measures of subsequent performance of research subjects.

The weaknesses of the quantitative method include:

- Failure to provide the researcher with information on the context of the situation where the studied phenomenon occurs (Alexei V. Matveev, 2002);
- Inability to control the environment where the respondents provide the answers to the questions in the survey;
- Limited outcomes to only those outlined in the original research proposal due to closed type questions and the structured format;
- Not encouraging the evolving and continuous investigation of a research phenomenon.

With consideration of the above strength and weakness to achieve the goals with PFI projects in Malaysia, the quantitative methodology is suitable to be adopted. An analysis of

the methodology used in journal papers related to various PFI issues (Kipli et al., 2016) which had been summarized in Figure 2 is then further summarised in Table 1. This is to find out the frequency of methodology approach used by the researchers. As no single study or method is universally appropriate for all research questions, the quantitative and qualitative methodologies are therefore sometimes integrated or triangulated for research (Fellows & Liu, 2003) (Jakubik, 2008).

Table 1. Methodology use by researchers in journal papers related to PFI issues

	Approach	Method	Abbreviation	Frequency
1	Quantitative	Questionnaires	Q	7
2	Qualitative	Interview	I	4
3	Qualitative	Critical Literature Review	CLR	4
4	Qualitative	Document review/analysis	DR	3
5	Qualitative	Document review & CLR	DR & CLR	1
6	Qualitative	Critical Literature Review & Interview	CLR & I	1
7	Mixed	Critical Literature Review & Questionnaires	CLR & I	2
8	Mixed	Document Review & Questionnaires	DR & Q	4
9	Mixed	Interview and Questionnaires	I & Q	4
10	Mixed	Questionnaires, Case Study, workshop	Q, CS & WS	3
				33

By referring to Figure 3 the qualitative method is the highest research approach used by the researchers which are 40% while the mixed mode is the second with 39% and the lowest is a quantitative method which is 21%. This show that not many researchers use the quantitative method in their study regarding various issues arise in PFI projects. So, we can look at this as an opportunity to look at a study using a quantitative approach.

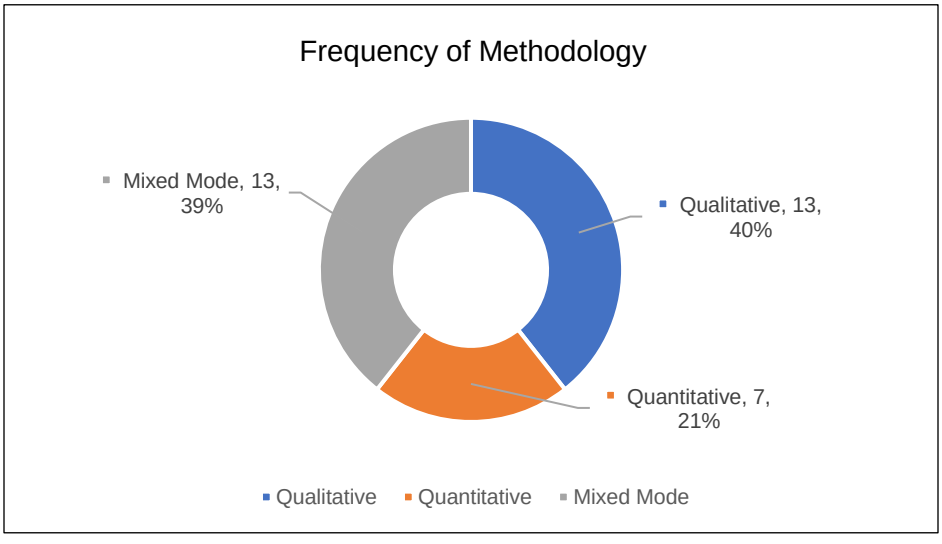

Figure 3. Frequency of Research Approach Use

Research Technique

Research techniques are depending on which research approach used by the research. Whether to use the quantitative approach or qualitative approach or mixed-method (Fellows & Liu, 2003). To look at the style of research technique used by the researchers in PPP/PFI

area, the analysis had been done as in Table 1. The paper that we are looking at is based on the keyword Private Finance Initiative (PFI)/Public-Private Partnership (PPP) which are published in Scopus, ISI journal which searched using the online database such as Emerald, ScienceDirect Journal, SAGE, Springer Link Journal, ProQuest Dissertations and Theses Global and in Google Scholar from the year 2002 until 2018. From the analysis, more than half which is 20 papers out of 33 researchers use the questionnaires technique as one of the methods to collect data from their respondents. Questionnaires are also the highest single technique used by the researchers in the analysis which are 7 research papers. Many research in PPP/PFI research use this method (Kurniawan et al., 2015; Cheng & Li, 2002).

Questionnaires

The questionnaire is one of the techniques in a quantitative method. It has a lot of benefit as to cost-effective, save time as it can be distributed to a lot of people and received within the required time and reduce the bias of interviews effect (Zoltán Dörnyei and Tatsuya Taguchi, 2010). According to Jenny Rowley (2014), questionnaires are useful when:

- The research objectives centre on surveying and profiling a situation, to develop overall patterns.
- Sufficient is already known about the situation under study that it is possible to formulate meaningful questions to include in the questionnaire.
- Willing respondents can be identified, who are in a position to provide meaningful data about a topic. Questionnaires should not only suit the research and the researcher, but also the respondents.

The questionnaires will consist of four sections in which the first section is the demographic section while the other 3 is the questions related to the three objectives which try to be achieved in the research. The questionnaires for the first part are asking about the demographics of the respondents. Such question ask is how long the experience of the respondents in the construction industry is and in handling the PFI projects other than their designation and position in the projects.

The second part will ask about the level of KM implementation in PFI projects during the pre-contract process. The PFI process and KM process are linked together in one question to see whether the KM process applied at each stage of the pre-contract process. The third part is asking about the KM barriers in PFI projects. The fourth section is asking about the critical success factors for KM success in PFI projects.

Research Respondents

Respondents for this research are identified based on the PFI projects under the Public-Private Partnership Unit (UKAS). Only those who handle the PFI projects will answer the questionnaires survey as the person who works in the PFI projects knows this procurement better. The designation and position of the respondents are listed in Table 2.

Table 2. The designation and position of the respondents.

Projects Involved	Public Sector	Private Sector
20 number of PFI Projects from the Public-Private Partnership Unit (UKAS)	1. Economic Planning Unit 2. Public-Private Partnership Unit (UKAS) 3. Financier Body 4. Ministry of Higher Education 5. Education Institutions/ Universities Project Director Quantity Surveyor Architect Electrical Engineer Civil Engineer Technical Assistant Residential Engineers	Concessionaires/Special Purpose Vehicles (SPV) Contractors Project Director Quantity surveyors Architect Civil Engineer QA/QC Officers Contractors Supervisor

CONCLUSION AND RECOMMENDATION

In the analysis, it found out that the quantitative method is the most less method employ by the researchers in their study related to the PFI projects. However, this method has the advantages of directing the finding of the research with the hypotheses that can be answered with statistical data analysis. So for the next research that will be carried out, the quantitative method would be employed to see the result in quantitative analysis while questionnaires will be used to collect the data as it is the most popular techniques as presented in Table 1. The summary of the research strategy is in that the suitable research approach would be quantitative method where questionnaires will be use and the questions are derived from the literature review. The respondents are the professionals involved in 20 PFI projects from Public-Private Partnership Unit (UKAS) database. Information sought will be level of knowledge management implementation, knowledge management barriers and critical success factors affecting knowledge management success in PFI projects.

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THE USE OF FIQH MUWAZANAT FOR MAKING DECISIONS IN THE INTEGRATION OF WAQF REAL ESTATE AND ZAKAT PROJECT DEVELOPMENT: QUALITATIVE STUDY

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Abstract
This research is important to investigate the integration of waqf real estate and zakat in the perspective of fiqh muwazanat to make decisions among State Islamic Religious Councils (SIRC) top management in deciding the developments of projects. In this context, qualitative research was conducted to achieve in-depth understanding on the feedback from the participants. This research involved the management of SIRC from the initial stage of the waqf and the zakat integration which determines the managerial process. Due to the complex process to carry out this integration of waqf real estate and zakat decisions, a qualitative study was conducted. Among 14 SIRCs in Malaysia, Pahang SIRCs was chosen as a good case for this present research because compared to other states, Pahang has the highest number of total land area in state which covers 3,596,582.00 hectares. The primary data was collected from semi-structured interviews with Pahang SIRCs officers from waqf and zakat department. Due to the interest in acquiring constructive information, qualitative study research included important explanations from the participants. Data was reported, transcribed and analysed using thematic analyses for multiple interviews. It has conclusively been shown that from Pahang SIRC officers' point of view, there is a need for an integration of waqf and zakat to cater the needs of asnaf. The use of fiqh muwazanat for making decisions is a consideration to allocate zakat fund among qualified asnaf. Finally, the managerial process, which is based on the tawhidic approach, is the fulfilment to emphasize justice for asnaf.

Keywords: *Fiqh Muwazanat concept in project development; integration of waqf real estate and zakat; Tawhidic approach.*

INTRODUCTION

Fiqh muwazanat (fiqh of balances) is an approach that is closely related to *fiqh al-awlawiyyat* (fiqh of priority) that influences our actions and decisions to ensure what we do is one of the highest and best uses. Historically, the term *Fiqh Muwazanat* has been used to describe the practices to make judgments between various forms of benefits and of the many virtues which have been prescribed (Abdul Muhaimin Mahmood, Abdull Rahman Mahmood, 2011). This shows a need to make decisions between multiple types of harm, damages and crimes that are prohibited by the Shari'a. *Fiqh muwazanat* defines what is meant by the importance of making judgments between all (interests) and harmful (damage), between good and bad when creating a balanced decision. In spite of its extensive coverage, *fiqh muwazanat* shows the highest and best use decision using of *zakat* fund for the fitting *asnaf*.

The concept of *fiqh muwazanat* is of the utmost importance of the Islamic philosophy to complete the function of man as a leader (*khalifah*). According to the Islamic philanthropy

worldview, *zakat* and *waqf*, in reality, are established to meet the basic needs of the needy. Based on the rights of the needy in Islam, the redistribution of wealth has stipulated *zakat* and *waqf* principles. *Zakat* recipients are referred to as *"asnaf"* and this group is protected in Al-Quran, and it is the responsibility of every Muslim who possesses wealth at or above a certain threshold to pay *zakat* to as a contribution to *asnaf*. Trough the contribution of *zakat*, *waqf* also serves as type of social welfare that supports *zakat*. *Waqf* is defined as an endowment imposed by a donor (*waqeef*) by giving their real estate for the public purpose in the name of Allah SWT. It seems that there is a challenge for the Muslims in Malaysia and around the world to place real estates for *waqf* due to the high value and affordability to do that. The only way to overcome the shortage of waqf real estate resources is by giving cash *waqf* to make their assets convertible into real estate.

Waqf is one of the oldest institutions in Islamic history. The practice of *waqf* has begun since the time of the Prophet Muhammad (SAW) when he built the Quba Mosque 'as part of a remarkable series on the mission of migrating to Medina (Mahamood & Ab Rahman, 2015). In Malaysia, matters related to religion are entirely under the authority of the Sultan in each state and the Sultan delegates the power to the SIRC to take charge of such issues including matters related to the *waqf*. This is because *waqf* matters are one of the aspects of the religious part listed under List II, State List, Ninth Schedule, Federation Constitution (C. Anan, 2015).

Zakat is an essential element in the Islamic system and plays a crucial role in empowering the needy. Zakat institution in Malaysia is now well established from a variety of studies (Hasan et al., 2019; Zunaidah Ab Hasan et al., 2017; Al Haq & Abd. Wahab, 2017) that have been done. As the third pillar of Islam, zakat has a 1,400-year-old story in succeeding egalitarian and redistributing resources to the poor that deserving zakat according to Al-Qur'an. Zakat is described as a compulsory allocation collected by the Zakat Institution from the rich people so that they can share their wealth with the poor.

One of the most meaningful discussions in this study is the integration of waqf real estate and zakat as the mechanism for project development. The study is structured in five main sections, beginning with the introduction in the first section. The second section consists of the literature review, followed by the methodology, data collection, analysis together with interpretation in the fourth section. The fifth section comprises the conclusions, recommendations and implications for future research.

The *waqf* and *zakat* components complement each other, where the *waqf* real estate needs funds to be develop, whereas *zakat* has the funds to be used for empowerment of *asnaf*. Therefore, for the purpose of infrastructure development for *asnaf's* use, why can the potential development on *waqf* real estate not be applied using *zakat* funds? Through this study, the processes and types of development that are permissible by Shariah will be discussed to be implemented in order to enhance the quality of life among asnaf.

FIQH MUWAZANAT APPROACH FOR INTEGRATION OF *WAQF* REAL ESTATE AND *ZAKAT*

Islamic philanthropies contribute to economic integration for *waqf* real estate and *zakat* according to *fiqh muwazanat* approach, which is necessary because it increases the revenue of the reserves for *asnaf*. The reason for the integration of *waqf* real estate and *zakat* in this

research framework is the ability to solve the direction of *asnaf* community economics along with the economy complements. The study of *fiqh muwazanat* on Islamic precepts and values show that the operation of *waqf* and *zakat* depends on the availability of *zakat* fund for the *asnaf* in the respective categories. As stated earlier, the allocation of *zakat* fund for the integration of *zakat* and *waqf* is the detailed specification on the benefits for *asnaf* and it is eminently useful in the context of developing the economy of *asnaf*.

The interpretation of *fiqh muwazanat* in the integration of *zakat* and *waqf* is to construct adequate distribution that represents sufficient resources to avoid misallocation of the funds among *asnaf*. The maslahah (importance/goodness) that has been fixed by Syariah matches the integration of *waqf* and *zakat*, and several conditions have been established to contribute to it. The following are some of the essential facts according to Syariah to be considered before the integration of *zakat* and *waqf* (Islam, n.d.):

i) *Dhoruriyat* – Basic essentials that are required for each individual to go through life such as religion, soul, and mind.
ii) *Haajiyat* – Things that individuals are able to live without but with difficulties. For example, home and vehicle.
iii) *Tahsiiniyat* - An enhanced comfort, pleasure, and luxury in life and it is also often referred to as a compliment such as a second vehicle, second home, extra furniture and more.

There is a strong rationale in *fiqh muwazanat* approach to be applied in the decision making on *zakat* and *waqf* integration to control the *waqf* and *zakat* resources. This is because of the strategies in economic integration, as mentioned previously; the misuse of the *zakat* fund could be avoided by constructing the best integration of *zakat* and *waqf* where the board of *zakat* management analyse the category of *asnaf* that will be benefited. This is because there are 8 categories of *asnaf*, and each category has different needs. Furthermore, a thoroughly managerial process from *waqf* and *zakat* organisation will serve justice for each category of *asnaf's* needs. The decision to integrate *waqf* and *zakat* is considered as a change to give better output to the needy life. It is relevant to the current situation, with the lack of development on the *waqf* real estate due to the financial matters. According to *fiqh muwazanat* approach, if the decision basis could fulfill *dhoruriyat* on *haajiyat* as well as *tahsiiniyat*, it is considered as acceptable. Although derived from the economic integration of Islamic philanthropy, the managerial process of this strategy should be assessed to make sure the welfare of each category of *asnaf* categorized is not neglected.

DEVELOPING CONCEPTUAL FRAMEWORKS PROCESS

Having discussed the fundamental aspects of the integration between *waqf* real estate and *zakat* using *fiqh muwazanat* principles, the present study proposed the conceptual framework structure that has been developed using thematic analysis based on literature review (Green, 2014). Literature review plays an important role to enhance the validity of variables and established the conceptual framework at initial stage (Rowley & Slack, 2004). Shahir Akram Hassan (2015) reviewed literature searching in Islamic studies and he explained four levels of *mantiq* or rationalism of the reliability of data which are *Yaqin*, *Zann*, *Shakk*, and *Batil* to justify researches related to Islam, considering the incorporation of al-Qur'an and hadiths. Out of these four, *yaqin* is the highest, followed sequentially by *zann*, *shakk*, and *batil*. The

reliability of data is based on evidence that sourced from al-Qur'an and hadith, also known as *yaqin*. In contrast to *yaqin*, *zann* and *shakk* only depend on either theoretical or empirical pieces of evidence or both, while *batil* does not has any evidence at all (Shahir Akram Hassan, 2015). A *hadith* narrated by Abu Dawood has clearly stated the hierarchy of "literature review" arrangement in Islamic studies, as quoted below (Imam Hafiz Abu Dawud Sulaiman bin Ash'ath, 2008);

> *Harith ibn Amr reported: The Messenger of Allah, peace, and blessings be upon him, sent Mu'adh to Yemen and he said, "How will you judge?" Mu'adh said, "I will judge according to the Book of Allah." The Prophet said, "What if it is not in the Book of Allah?" Mu'adh said, "Then with the tradition (sunnah) of the Messenger of Allah." The Prophet said, "What if it is not in the tradition of the Messenger of Allah?" Mu'adh said, "Then I will strive to form an opinion (ijtihad)." The Prophet said, "All praise is due to Allah who has made suitable the messenger of the Messenger of Allah."*

Literature review arrangement offers an effective way of sorting the hierarchy of data reliability from an Islamic point of view. In this research context, the integration and collaboration of *waqf* and *zakat* directly is not discussed in the Al- Quran and *hadiths* from principles and practices. Historically, the integration of *waqf* and *zakat* is also not mentioned by Muslim societies during the early period of Islamic civilization. Since the incorporation of *waqf* and *zakat* is not practiced, it is considered new and has not been adequately examined. The literature on *waqf* and *zakat* integration has been mentioned by contemporary Islamic scholars such as Khairuddin et al. (2015), Nasim Shah (2014), Ataul Huq Pramanik et al. (2013), and Hassanain (2015) to respond that the idea to integrate *waqf* and *zakat* are still in a learning process.

Concerning the challenges and issues that are faced by the State Islamic Religious Council (SIRC) in integrating *waqf* and *zakat*, management awareness on the potential of this implementation is needed. Therefore, the management team should have the consent for the institution to utilize *waqf* and *zakat* effectively. Through this related issue, strategic management theory is applied to rule this research. Since the fatwa related to the *waqf* and *zakat* integration was established gradually by each SIRC, the research fundamental is focusing on the formation of the management unit to strengthen the *waqf* and *zakat* integration.

For the current study, the development project using waqf real estate and zakat fund has been determined according to the Shariah and the needs of *asnaf*. The management of *waqf* and *zakat* to be integrated is one of the decisions made by SIRC to enhance the development projects for *asnaf*. The management considers the use of estate from the view of its location, financial ability to develop expansion project and the most potential group of asnaf to reside the estate from the view of social and long-term economy. The point of *waqf* estate development to be integrated with *zakat* fund has been agreed upon and analysed using *fiqh* approach that the bases the decision making, which is *fiqh-almuwazanat*. For this purpose, the SIRC management's knowledge on this valuable idea will determine the decision-making process. Therefore, there is the need for the development of the best practices of project management for waqf real estate and zakat integration to overcome any constraints regarding syariah, management and projects development.

As mentioned earlier, after having reviewed the related literature regarding strategic management to integrate *waqf* and *zakat*, this conceptual framework is an initial output before the field study was carried out to determine the final structure of the conceptual framework. In describing the process of getting the relevant variables from related literature, suggested procedures involved are outlined in Figure 1, which is supported by NVivo version 12 to enhance the accuracy of managing the information (Bazeley & Jackson, 2014). Using NVivo version 12, data were imported into the system. In this research, data were obtained from journals, books and conference papers. Shariah literature appears to be the primary data to bound all works of literature. As highlighted in the literature, the establishment of the framework is the combination of various disciplines according to the needs of the research. As shown in Figure 1, there are 19 variables that have been recognised as the factors that integrate *waqf* and *zakat* process. Since organisations are treated as a separate identity, these 19 variables will be accepted by SIRC depending on their needs as specified by the management. The beauty of this institution is that it permits them the right to manage internal and external matters depending on *fatwa* made by *Mufti* (an expert that has the authority to provide rulings and decisions on religious issues) by each SIRC.

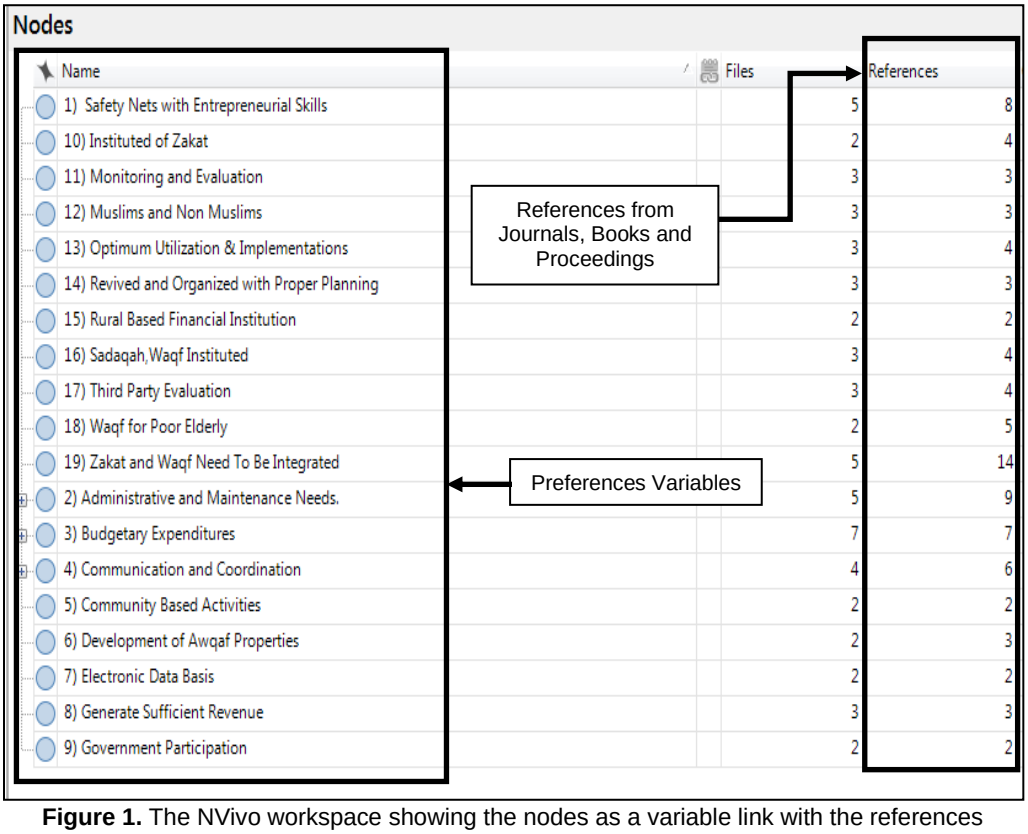

Figure 1. The NVivo workspace showing the nodes as a variable link with the references

In NVivo, the researcher, make a node for each variable to be stored, much like designating a file. At a second level of the process, variables are sort in the conceptual framework. Figure 2 shows the conceptual framework that has been expansion base on the literature review development.

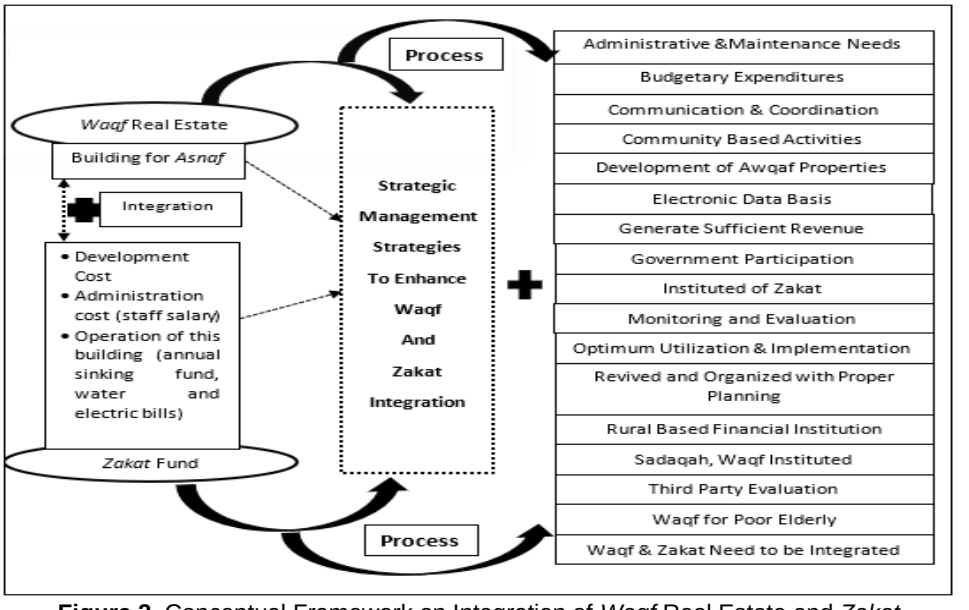

Figure 2. Conceptual Framework on Integration of *Waqf* Real Estate and *Zakat*

THE PROCESS OF DEVELOPING CONCEPTUAL FRAMEWORKS

The modus operandi for this research is to reach an explanation of how Pahang SIRC management decides to integrate or not to integrate *waqf* and *zakat* in their projects for the needy. The main factor that helps this study to be applied in qualitative research is to get a depth opinion on *waqf* and *zakat* integration among the practitioners. However, what does making sense out of the qualitative data mean? In the qualitative data analysis, the process is used to answer the research question, where it blends the problem statement as central to the procedure (Merriam, 2009).

How do the researchers select Pahang SIRC to be the sample of the study? Is there any procedure or formula to set up? According to Ilker Etikan, Sulaiman Abubakar Musa and Rukayya Sunusi Alkassim (2015), the participants in the qualitative study were recruited from non-probability sampling which is the most chosen for this type of research. As mention by Masson (2002) purposive sampling depends on the objectives of the study and the researcher is the appropriate person to decide how many and who should be the sample. Along with the research objective, this research chose Pahang SIRC as a sample because the number of *waqf* and *zakat* integration projects managed by Pahanag SIRC was among the highest in Malaysia. What are the factors contributing to the right decision by the management of Pahang SIRC to have the vision to integrate *waqf* and *zakat*, when many other SIRCs in Malaysia are unable to forsee the idea from the same perspective? Being actively participating in this research, the researcher has interviewed three informants to be part of this research. Figure 3 shows the research process emphasising on data collection strategy and thematic analysis criteria identified from the selected informants.

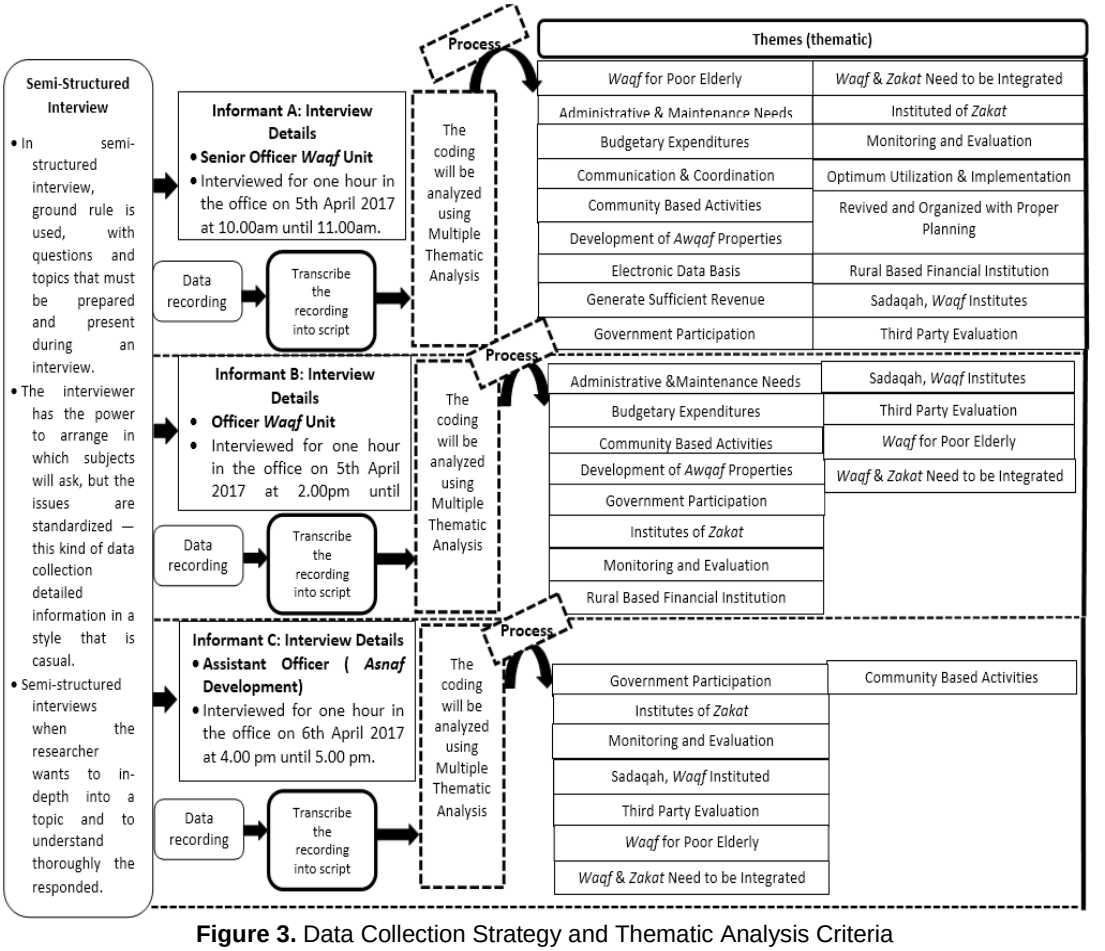

Figure 3. Data Collection Strategy and Thematic Analysis Criteria

Moreover, Figure 3 detailed the dates and the time of the interviews. The semi-structured interview method was selected as the best data collection strategy as it relatively helps the researcher to get rich data upon the interview process. The hardest part of the qualitative study is to transcribe the recordings into transcriptions, where the researcher has to stay focus until it is finished.

RESULTS AND DISCUSSIONS

The discussion determined to interpret the importance of using Fiqh Muwazanat as a guiding principle for the SIRC Pahang management to decide the integration of waqf real estate and zakat funds. The value of choosing to incorporate waqf real estate and zakat is a difficult process as waqf and zakat involve a shariah basis in its implementation. The significance of the findings from the interview results found that the three participants had different opinions and thoughts regarding their positions. Based on the process of integration of waqf and zakat, all three informants share the same opinion in several findings, for example, they agreed that waqf and zakat need to complement each other and the strength of waqf and zakat is a community-based. The first informant is a Senior Officer Waqf Unit has the knowledge, experience and wise decision making. He outlined the integration of waqf and zakat to meet the needs of asnaf enrichment development where, if the cost of real estate

through the use of waqf is applied, it can optimize the use of waqf land resources with proper planning. Referring to the concept of appropriate planning, strategic management theory outlined by (Athapaththu, 2016) states that adequate planning among top management is essential as a practice to avoid development planning mistakes.

Figure 3 clearly illustrates the role of Informant A, who clearly understands that excellent strategic management processes deliver the benefits that can be gained by the involvement in the strategic planning and management of Fiqh Muwazanat. Throughout dialogue or enhanced communication and participation, managers and employees can support organization for successful strategic management (David, 2011) All firms need help from the employees to successfully fulfil their mission. This decision making is where the assimilation between Informant A's, Informant B's and Informant C's role in understanding the value of Fiqh Muwazanat. Strategic management processes encourage all managers and employees to merge with the organization to obtain good results in management.

Informant A also emphasized that process monitoring and evaluation in the integration of waqf and zakat are beneficial principles for the organization, as the optimal utilization of waqf and zakat resources needs to ensure proper implementation and no leakage. Strategic definition of management in empowering waqf and zakat through Fiqh Muwazanat; "Fiqh Muwazanat's strategy is an action plan used to formulate goals, objectives and methods achieve these goals and objectives based on the Shariah concept of waqf and zakat". The planning of this strategy is the road map for Pahang SIRC helps manage the organization, mainly if the strategic plan works throughout the organization.

Strategic thinking through management is a more critical aspect of senior management responsibility. The strategic planning process of Fiqh Muwazanat is a very comprehensive process that requires a lot of thinking strategies. The Mufti (leader in giving an opinion on Islamic Laws) plays a significant role in refining the importance of the integration of waqf and zakat from the Shari'a perspective. Strategic management helps organizations to define its mission and objectives by creating and maintaining a competitive advantage. Today's organizations like Pahang SIRC have realized the benefits of strategic management in their operation.

FINDINGS AND CONCLUSION

On an integrated level, the findings of this study on the integration of *waqf* and *zakat* are crucial in strengthening *asnaf* comprehensively. The needs of *asnaf* according to Islamic guidelines is the starting point to drive the project of developing *waqf* and *zakat* to meet the designated objectives. Thus, to conclude, the integration of *waqf* and *zakat* from the viewpoint of *fiqh muwazanat* is an approach towards auditing process in choosing the most deserved *asnaf* to be benefited from the integration of *waqf* and *zakat*. When the informants responded to the questions related to the pattern of conceptual framework, it reflects the substantive theory from the analytic induction of the strategic management. The data themes show that the integration of *waqf* and *zakat* in Pahang SIRC is influenced by the position of the informant in the organization. Table 1 points out the combination of *waqf* and *zakat* in specific projects. The Pahang SIRC management team has done the project that integrates *waqf* and *zakat* components as the part of innovations. The way they came out with the idea and managed to deliver it into action is something new in Malaysia environment. The thematic

analysis in Figure 3 shows that the Senior officer from *waqf* units has matured ideas and ample of knowledge to lead the project's innovation.

Table 1. Number of Projects that integrate *waqf* and *zakat* in SIRC Pahang

States	Types of Development in *Waqf* Land	Purposes
Pahang	*Asnaf* Complex built on 3.4-acre *waqf* land	Shelter homes for poor and needy *asnaf*, especially among the elderly to stay in the Complex *Asnaf*.
	Al-Amin Clinic developed on *waqf* concept	Most of the patients are from *asnaf* category and they are funded using *zakat* fund to get the services from the Clinic.
	Bangunan Wisma Pahang in NASR City, Cairo, Egypt	11 storey building, hostel for the student (*asnaf* fisabilillah)
	Training Centre located at Jambu Rias,Karak,Bentong	Training Centre for *asnaf*
	42 units of *waqf* Baazar Rakyat was built in Pahang	Premises for *asnaf* to start to involve in business
	Three units of houses were endowed, which is located two in Kuantan and one in Pekan.	It was rent out by *asnaf* at lower rental value.
	Hostel for Universiti Malaysia Pahang student was developing in the university campus.	Hostel for the student (*asnaf* fisabilillah)

The ecosystem of philanthropic strategic management's awareness towards the relationship between *waqf* and *zakat* provides advantages for *asnaf* to have lasting development compared to the traditional way of handling *zakat* as petty cash. The concept of *fiqh muwazanat* in this study was performed according to Shariah principles, and *fatwa* approved from the *Mufti*'s point of view before they can proceed with the projects. The significant findings in this study show that the think tank of this project was the experience senior of *waqf* unit. His leadership and intelligence attitude provide Pahang SIRC an opportunity to produce high impact and sustainable development by having a building for *asnaf* using *zakat* fund.

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THE INFLUENCE OF BIM TRAINING ON BIM ADOPTION IN GOVERNMENT AGENCIES

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Abstract
The adoption of Building Information Modelling (BIM) as a technological advancement in the industry has become a primary concern among its stakeholders. Despite the improving level of awareness on BIM, the rate of adoption is relatively low. Research and expert advice have claimed that the BIM adoption rate can be increased by intensifying their understanding of BIM implementation's importance and benefits. Hence, the execution of training in an organization can potentially expedite the adoption rate of BIM usage. BIM training plays a crucial role in influencing the adoption rate since it not only acts as a mechanism to expand knowledge, but it facilitates the BIM adoption. Therefore, the aim of this study is to investigate the influence of BIM training on attitudes to BIM implementation among construction players in Malaysian Public Works Department (PWD) by using an extended technology acceptance model (TAM). 204 responses among professional construction employees of government agencies were received through an online survey. The findings revealed that the extent of training did not show any significant relationship with the TAM model variables, suggesting that a high amount of training would not positively affect BIM adoption. Nevertheless, the results showed that the TAM model variables had significant positive relationships with the variable behavioural intention to use. The vital implications of the findings from this study emphasis that the role of training is an essential mechanism for managing perceptions of individuals about the availability of resources to practice and master the use of BIM. The results indicated that it is essential to balance the aspects of learning between the fundamentals of design and construction using BIM software with the understanding of BIM as a method rather than just a technology. This study suggests that training should not be considered just a medium of expanding BIM knowledge, but it is an important element in facilitating BIM adoption.

Keywords: *BIM; TAM model; training; BIM adoption; government agencies.*

INTRODUCTION

Building Information Modelling (BIM), as one of the emerging IT applications in construction, has grown exponentially and is being used widely in many countries to design, construct, and operate the facilities (Wong et al., 2009). The awareness of BIM in the Malaysian construction industry has proliferated (Hussain et al., 2015) and the Malaysian construction players have started utilising BIM in their project management, especially the high-profile construction projects. A recent study in the Malaysia context showed that only a minority of 22% of construction players across the states are not aware of BIM practice, while the remaining 78% were aware (Al-Ashmori et al., 2020). However, the utilisation of BIM technology by construction players in Malaysia is not widely used and is still at the initial phase (Hussain et al., 2015). A recent study in Malaysia revealed that only 8.2 percent of the public sector and only 4.9 percent of the private sector use BIM technology (Othman et al., 2020).The need of BIM implementation in improving coordination and communication of activities among project participants (Cao et al., 2015) can reduces the project duration and

cost in construction (Hwang et al., 2019; Cao et al., 2015; Azhar et al., 2008). In 2007, the BIM implementation initiative in Malaysia was mooted by the Director of Public Works Department (PWD), a government agency (Latiffi et al., 2013). The initiative of BIM implementation in Malaysia resulted from the government's awareness of the BIM benefits to handle the construction project issues in design and construction phase and to control the project cost. The government took a step forward by establishing a committee responsible for selecting the best BIM platform to be used and identifying relevant projects as BIM's pilot projects. In addition, a standard manual guideline on how to apply BIM in construction projects had also been established since 2014 by the Public Works Department for the use of construction players (Jabatan Kerja Raya, 2014). Despite these initiatives, the uptake of BIM adoptions is still progressively slow. Thus, this paper aims to examine the influence of BIM training among construction professionals in government agencies. The extended technology acceptance model (TAM) is used as a guide to assess the BIM adoption rate. The findings would optimistically persuade the construction players to enhance their BIM knowledge and awareness by participating in government and other appointed agencies' training.

PROBLEM STATEMENT

In order to streamline the Malaysian construction industry as a vibrant market, the Construction Industry Transformation Plan (CITP) was launched to achieve the goals of the Eleventh Malaysia Plan (RMK11) and the Economic Transformation Program (ETP) (CIDB, 2015). Productivity is one of the four strategic thrusts in CITP. One of the six productivity-related issues besets the construction industry that is essential to address is the low adoption of BIM (CIDB, 2015). The adoption of BIM in Malaysia at 10% is considered low compared to developed countries such as United States at 71%, Singapore at 65% (CIDB, 2015), United Kingdom at 39% (McGraw Hill Construction, 2014). Royal Institution of Charted Surveyor (RICS) reported that 51% of construction building professionals in the European continent have not changed entirely to digital working methods, where others do not make full use of the technology such as BIM (Mcadoo & Bentley, 2019). Ibrahim and Abdullahi (2016) accentuated that in developing countries, the adoption of BIM is quite the opposite of the developed countries. Despite its popularity in the Malaysian construction industry, the utilisation of BIM among construction players is still low as they perceive BIM as a new technology (Zakaria et al., 2014; Haron et al., 2015). The utilization of BIM technology by construction players is not widely used, and its' implementation is still at a novice level (Hussain et al., 2015; Othman et al., 2020). The Malaysian construction players reported that they are not convinced and have doubts about the benefits of implementing BIM due to the limited evidence of case studies to showcase the time and cost reduction achieved (Othman et al., 2020).

Although Malaysia government has initiated the use of BIM in construction projects, construction industry players are still struggling to adapt BIM process in a construction project that requires 2D working environment converted to 3D working environment (Latiffi et al., 2013; Zakaria et al., 2013). Hadzaman et al. (2015) stated that Malaysia's maturity stage is still at the beginning stage as papers and drawings are still treated as the key data exchange mechanism. Malaysian construction players have made a positive progress where they have started to shift from Level 0 to Level 1 in the BIM maturity stages. Furthermore, there is a need to educate construction players through professional training. Elijah & Oluwasuji, (2019) emphasized that continuous training among project participants is needed as the

previous training they attended will become obsolete and irrelevant as the technology updates. Globally, embracing and adopting BIM nowadays has encountered several barriers, which include the reluctance of changing current work practice (Johnson and Laepple, 2003), lack of clarity on responsibilities and roles (Holzer, 2007) and lack of training (Berstein and Pitman, 2004). In the Malaysian context, training is becoming a significant factor that affect BIM adoption. Lack of BIM knowledge (Zakaria et al., 2013) lack of trained people (Baba, 2010; Rogers et al., 2015) and lack of training (Rogers, 2013) are several major barriers that are related to BIM training in Malaysian construction industry.

LITERATURE REVIEW

This section presents the scenario of BIM adoption in Malaysia construction industry as well as the level of training towards construction players' attitude. The issues of BIM adoption in Malaysian will be elaborated further in comparison to the international practice to improve the practice of BIM training and whether training could change on the attitude towards the acceptance of BIM technology in Malaysian construction industry.

Building Information Modelling (BIM) in Malaysia

BIM constitutes computer-generated dimensional models to facilitate a facility's construction processes (Lan et al., 2015). The facility models are presented in three-dimensional (3D) visualisation (Wang et al., 2015). Though, most of the BIM interpretation recently are focusing on the collaboration aspect in project management. BIM is also defined as a process of managing information by enabling collaboration of various stakeholders at different stages of a building life cycle to exchange and extract information through the application of various information communication technology (ICT) (Davies and Harty, 2013; Alreshidi et al., 2017). The application of Building Information Modelling (BIM) for project delivery is rapidly becoming more popular in the Malaysian construction industry. Kermanshahi et al. (2020) stated that Malaysia government made a tremendous effort in enhancing BIM for construction projects. Hussain et al. (2015) earlier stated that the awareness of BIM in Malaysia construction industry has grown rapidly, and the Malaysian construction players have started utilising BIM in their project management especially the high-profile construction projects. However, the utilisation of BIM technology by construction players is not widely used and is still at the early phase (Hussain et al., 2015). The claimed benefits of using BIM are such as improved performance of the construction project life cycle (Othman et al., 2020), and increased productivity (Alreshidi et al., 2017) are still unconvincing to the construction players in Malaysia which was revealed in a study by (Al-Ashmori et al., 2020). Nevertheless, the findings by (Al-Ashmori et al., 2020) do not represent the population of Malaysia's construction professionals since the study only managed to obtain approximately a minority percentage of 15%. Majority of the responses from the study were from the views of the contractors in Malaysia. Both recent studies on BIM in the Malaysia context (Al-Ashmori et al., 2020; Othman et al., 2020) supported the idea of intensifying BIM practice knowledge to the construction players. However, the recommendation was not further examined as to whether it effectively increases the adoption rate of BIM.

Building Information Modelling (BIM) Training in Malaysia Construction Industry

Noe (2005) stated the term 'training' is used as a strategic resolution to support job learning process-related skills, knowledge, ability, and behaviour that are pivotal for job performance in enhancing organisation effectiveness. Supported by Katou and Budhwar (2006) as they defined training as a transfer tools of knowledge, skills, and competence to enhance employees' performance on current and future jobs. In BIM implementation, training appraisal needs should go through attentive consideration, as organising BIM training has become the most significant challenge in BIM adoption. BIM training can be organised as either an in-house training or external training (Pena, 2011). Organisations with more BIM experience are inclined to organise in-house BIM training due to the organisations capability to provide BIM trainer or BIM manager who will conduct the training sessions (Pena, 2011).

There are many organisations actively involved and provide BIM training to Malaysian construction players. These organisations consist of government agencies, professional bodies (architect, engineer and quantity surveyor) and private organisations. The main organisations that provide intense BIM training are government agencies, namely the Construction Industry Development Board Malaysia (CIDB) and the Malaysian Public Work Department (PWD). This is because both agencies have significant roles in designing and organising BIM training and these organisations also are the most active organisations in providing BIM training in Malaysia.

CIDB and PWD organised intensive training for practitioners who want to deepen their knowledge and skill of BIM in greater depth, particularly for the use of BIM software called technical training. The key purpose of technical training is to convey the right techniques and tools in the use of BIM and train participant to practice BIM software during the training or workshop to ensure the participant can effectually adapt the use of BIM software and apply the BIM in their work efficiently, thus, eventually improve their work performance. This training is designed to ensure that every training programme provided suits the participants' professions, such as architects, engineers, and quantity surveyors. The example of CIDB and PWD's technical training are Autodesk Navisworks, Revit Architecture Essential, ArchiCAD, Revit MEP and Revit. Online courses such as the concept and theory of BIM are also made available to interested public users (CIDB, 2020). Several manual guidelines on BIM implementation are also made available via the CIDB official website (CIDB, 2017). With these intensive training and online resources instigated by the government agencies, it is unknown whether it has improved BIM's adoption rate. The efforts made by the government agencies by executing several training programmes would be a waste if the rise in the BIM adoption rate did not have a significant effect.

METHODOLOGY AND ANALYSIS

Since the research aim is to examine the influence of BIM training on BIM adoption in Malaysian construction industry, the experience and opinions of construction professionals are needed from those directly involved in the industry. The study comprises two key data collection elements: 1) secondary research – mainly involves a large body of literature review – includes particularly investigation of BIM adoption and training in Malaysian construction industry; and 2) primary research where for this study questionnaire is used as a survey tool

to collect adequate primary data. The questionnaire was designed and organised online via a commercial survey website. The method involves the design and management of an online questionnaire-based survey to professionals in construction industry.

The closed-ended question has been adopted and the structure of questionnaire was divided into three main parts consisting of the awareness of BIM and the participation of BIM training – Part 1, the training and BIM adoption – Part 2 and personal information – Part 3. The basis of BIM training participation is introductory and technical training organised by the PWD and the CIDB. The second part of the survey focused on respondents' reaction on the BIM training and attitudes towards BIM adoption based on scale items described in Table 1. A 5-point likert-scale (1 means strongly disagree and 5 means strongly agree) was applied to investigate their level of agreement with 16 measurement items. These 16 items were categorised in five main groups (training reaction, ease of use, usefulness, employer resources and intention to use). In the latter part of the questionnaire, respondents were asked demographic information such as professional background, current job title and work experience.

Table 1. Scale items

Variables	Item ID	Item wording used in questionnaire
Extent of training	EOT1	Introductory training attended by participants
	EOT2	Technical (software) training attended by participants
Training reaction	TR1	Overall, I enjoyed the training session(s)
	TR2	I am satisfied with my level of learning from the training session(s)
	TR3	The training session(s) met my expectations
Ease of use	EOU1	It will be easy for me to remember how to perform tasks using BIM
	EOU2	I believe that it will be easy to get BIM to do what I want it to do
	EOU3	My interaction with BIM will be clear and understandable
Usefulness	U1	Using BIM will enable me to accomplish tasks more quickly
	U2	Using BIM will improve my work performance
	U3	Using BIM will give me greater control over my work
	U4	Using BIM will improve the quality of the work I do
	U5	Using BIM will enhance my effectiveness doing my job
Employee resources	ER1	I will be able to find the time I would need to use BIM in my job
	ER2	I would have the documentation (manual, on-line library, etc.) I would need to use BIM in my job
	ER3	I have access to the resources I will need to use BIM in my job
Intention to use	ITU1	I intend to use BIM as soon as I can
	ITU2	During the next few months, I plan to practice using BIM

The survey target for this study was project stakeholders of government agencies in Malaysia related to construction industry. These agencies play main roles in planning, design and construction of government infrastructure projects. The potential participants for this study have been invited to participate the survey via an email invitation. The invitation was sent to the participants regardless of whether they have experience in attending BIM training or not.

This study suggested the following hypotheses:

Hypothesis 2 (H2): There will be a significant relationship between perceived ease of use and intention to use.
Hypothesis 4 (H4): There will be a significant relationship between perceived usefulness and intention to use.
Hypothesis 6 (H6): There will be a significant relationship between perceived employee resources and intention to use.

Theoretical Framework: Extended Technology Acceptance Model (TAM)

Extended TAM for technology implementation training invented by Marler et al. (2006) was utilised as a means for measuring the influence of training on behavioural intentions to use BIM. Marler et al. (2006) used this extended TAM for their research on technology implementation training to investigate the influence of training in helping acceptance of the technology by employees in mandated organisation-wide information technology implementations. Originally, Mathieson et al. (2001) have proposed to add one more belief that is called perceived resources as an additional to perceived ease of use and usefulness. The perceived of resources is defined as the extent to which a person believes that he or she has the required personal and organisational resources in order to utilise a technology or an information system (Mathieson et al., 2001).

The extended TAM asserts that perceived resource is an additional key belief together with ease of use and usefulness as internal variables that could mediate relationships between external variables and intentions to use a new technology Mathieson et al. (2001). Mathieson et al. advocated the perceived resources is essential and has significant effect on TAM due to it considers the perceptions of the implemented technology environment and not only just the technology features. They also added that the perceived resources would contribute positive impact on intention to use a technology because it has a direct relationship with the potential barrier to use and organisational support. Thus, the extended TAM related to technology training is particularly focused on the specified external variables of extent of training and training reaction that affect the intention of use the technology with influence of internal belief of ease of use, usefulness, employee resources Marler et al. (2006) as shown in Figure 1:

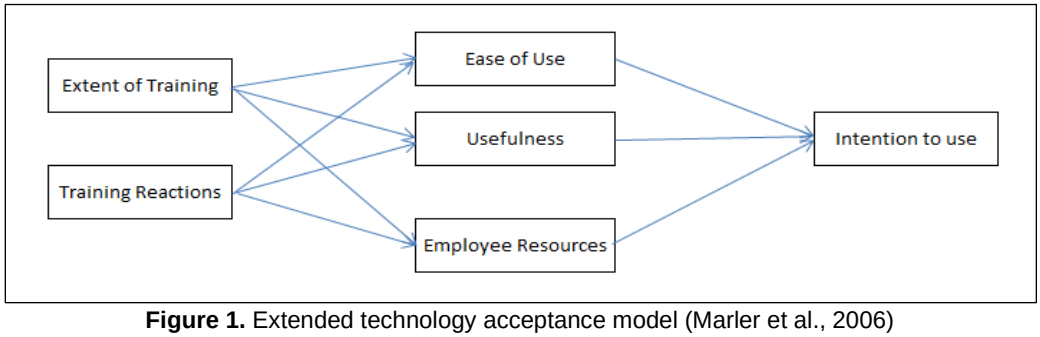

Figure 1. Extended technology acceptance model (Marler et al., 2006)

RESULT AND ANALYSIS

The total of 204 online questionnaires was received and have been completely answered by the respondents. Personal information in the answered questionnaire showed that the respondents consist of various professional backgrounds in the following proportions. The

majority of respondents were from a range of low-medium level of working experience (1 to 15 years), making up 80% of the respondent. The demographic results are listed in the Table 2.

Table 2. Demographic characteristic of the respondents

Characteristic	Frequency	Percent
Professional background		
Architecture	25	12%
Civil and structural engineering	70	34%
Mechanical engineering	37	18%
Electrical engineering	21	10%
Quantity surveying	47	23%
Building surveying	3	2%
Project management	1	1%

Tests of hypotheses: Extended Technology Acceptance Model (TAM)

Pearson's correlation coefficient approach was employed to measure the linear relationship (correlation) between the variables in the research model. A pair of the variables in the hypotheses were tested in order to examine if there is a significant relationship between two variables in each hypothesis. In determining the level of significant correlation, the guide proposed by Evans (1996) was used to determine the significant level of value of r which consisting 'very weak' (0.00 - 0.19), 'weak' (0.20 – 0.39), 'moderate' (0.40 – 0.59), 'strong' (0.60 – 0.79), 'very strong' (0.80 – 1.00).

Table 3. Correlation coefficients

Variable	EOT	TR	EOU	U	ER	ITU
EOT						
TR	0.19					
EOU	0.17	.68**				
U	0.15	.58**	.68**			
ER	.30**	.49**	.50**	.57**		
ITU	.23*	.43**	.47**	.58**	.53**	

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Relationship between TAM variables and ITU

The testing results of H2, H4 and H6 demonstrated that there were positive effects on BIM adoption as the TAM variables have moderate significant positive correlation with ITU. Firstly, Ease of Use (EOU) variable has a positive influence on Intention to Use (ITU) variable (H2) and consequently, this result supports the previous research (Ventakesh et al., 1999; Ventakesh et al., 2002; Davies and Harty, 2013; Son et al., 2015; Yang, 2015). Moreover, this result supports Davis et al. (1989) argument that EOU might have a higher impact on ITU in high complex system. Even though this result is consistent with those of Marler et al. (2006), their study's significant relationship is weak. This result may be explained by the fact that the perspective of EOU in technology implementation is a key attribute that individuals would consider about. The review literature suggested that individual's positive perception of EOU might increase the behavioural of ITU. Therefore, the simpler the BIM is used and interacted

with, the greater the probability of using it in the long term. Hence, how training is designed should focus on ensuring the application of BIM to be easy and user-friendly in a construction project.

Similarly, usefulness (U) variable also has a moderate significant positive relationship with intention to use (ITU) variable (H4). A possible explanation is that for the individuals who attended the training, they might have enhanced their awareness of BIM's usefulness after attending the training and consequently increasing their behavioural ITU. For individuals with no training experience, information on the usefulness of BIM application could be obtained from their colleagues' experience who have used it, resulting in influencing their intention to use BIM. There are similarities between this significant relationship and those described by Ventakesh (1999); Ventakesh et at. (2001); Davies and Harty (2013); Son et al. (2015); Yang (2015) previous research. Surprisingly, this finding does not support the finding in the research of behavioural intention to use IS by Jackson et al. (1997). They stated that perceived U variable has no significant relationship with behavioural ITU. Their finding is consistent with Davis et al. (1989) argument that U variable has minimal influence on ITU at the early stage of a development project. Davis et al. (1989) argued that it is not easy to understand the usefulness of the system before implementation even though the system's users may be able to evaluate the multi-attribute of the IS prior to implementation. Furthermore, earlier by Jackson et al. (1997) added that the difficulty of measurement might be ascribed to the fact that perceived U is a performance measure which consumes time and actual practice to evaluate.

Lastly, employee resource (ER) variable has a significant positive correlation with ITU variable (H6) which supports previous research Marler et al. (2006). The employee might likely consider a few beliefs before they could have intention to use BM. The beliefs are whether they will have enough time to practice and learn BIM, receive sufficient support throughout the learning process, and acquire adequate resources and help from experts.

Relationship between training variables (EOT and TR) and ITU

The model in Figure 2 suggests that the relationship between training variables Training Reaction (TR) with Intention to Use (ITU) are moderate. While the relationship between variable Extent of Training (EOT) with Intention to Use (ITU) are weak. This pattern of correlations is similar to that between the training and TAM variables and the interpretations above. It is worth reflecting on fundamental alternative interpretations of these relationships due to the research's cross-sectional nature. While the significant relationships are consistent with the causal assumptions in Figure 4, it is impossible to rule out alternative causal paths.

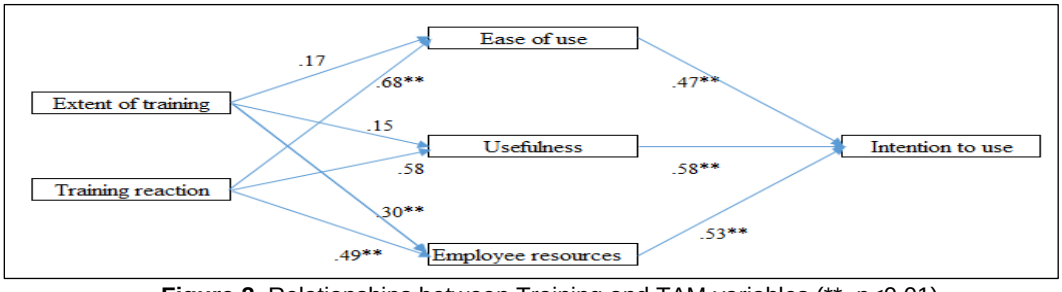

Figure 2. Relationships between Training and TAM variables (**=p<0.01)

For EOT, a strong ITU might prompt someone to seek out and attend BIM training. Equally, relationships seen may be due to the measured variables both being related to an unmeasured third variable, for example, an employee who has been assigned to a BIM project might score highly on both EOT and ITU without the training having had any actual effect on intention. Although, these findings are consistent with those of Marler et al. (2006) who found significant positive correlation between EOT and ITU in IT implementation, the level of significant positive correlation, is weak. This result also corroborates the ideas of previous researchers (Denby, 2010; Nassazi, 2013; Govil and Usha, 2014), who suggested that the training role is to impart knowledge and skills required by participants and require further training to expand the knowledge and sharpen the skills that they have learned in order to ease the adoption process.

For Training Reaction (TR) variable, the moderate relationship with ITU indicates that the enjoyment, satisfaction, and expectation of training have fulfilled the participant's needs in participating BIM training. It is encouraging to compare this finding with that found by Ventakesh et al. (2001), who discovered that a positive reaction after game-based training session influenced intention to use technology. Their research was based on the enjoyable training environment, which is a part of the TR element in this study. This finding also corroborates Kirkpatrick (1967) idea, who argued positive training reaction could motivate and encourage trainees to learn. In addition, this finding is consistent with previous study by Steward and Mohamed (2003), who suggested that expanding knowledge and sharpening skills are essential to adopt new technology and increase self-confidence to use the technology. These results imply that the training contents and experienced trainers are important elements in creating conducive training environment that may turn into main psychological factors to influence participants to use BIM.

CONCLUSION

The study has tested a model of the influence of BIM training on attitudes to BIM adoption among Malaysian construction players, based on the extended TAM model offered by Marler et al. (2006). Firstly, it has been found that TAM variables (Ease of Use (EOU), Usefulness (U) and Employee Resource (ER)) have significant positive relationships with the behavioural ITU, which accorded with most of the previous research findings. Though results showed positive relationship, its level of association was determined between moderate to weak. The findings show an opportunity to change the way training programmes are delivered in Malaysia. Participants in the training programme should illustrate their learning experience that the application of BIM is simple and very useful. Even though it was consistent with the finding in correlations between training variables (Extent of Training (EOT) and Training Reaction (TR)) and behavioural ITU.

With the view of BIM adoption in Malaysian construction industry, providing effective training programmes is essential to support the professional in using BIM efficiently. It is clear in the findings that professionals still lack intention in using BIM despite that they have participated BIM training. This might be due to the lack of understanding of the BIM benefits in spite of the participants' attendance in introductory training, technical training or a combination of these two trainings. To promote the BIM implementation, the construction players need to be trained accordingly. In stepping ahead to utilize BIM, government agencies and BIM specialist would be the most appropriate organisations to organise BIM training

sessions for Malaysian professionals. This collaboration could also provide a better platform in providing effective and efficient BIM training by improving the training's objectives to enhance the awareness of BIM benefits and focus on improving the training's content and the level of knowledge and skill to be provided.

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CORPORATE REAL ESTATE: A MALAYSIAN PERSPECTIVE

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Abstract
The term corporate real estate (CRE) refers to lands and buildings owned by corporations that are not dealing primarily in real estate business. This description is used globally to classify corporate real estate. The emergence of knowledge on the benefits that may be reaped from property investments has encouraged many corporations to delve in property development and property investment. Hence, the definition of CRE nowadays should be improvised to suit the paradigm shifts, as well as the country policies. Aligning with this objective, an investigation to determine CRE from the Malaysian perspective was conducted through semi-structured interviews with seven real estate experts consisting of CRE managers who directly manage green CRE office. The investigation has gained a different view of CRE interpretation from industry. It was found that CRE in Malaysia can be classified as properties owned or leased by corporations that are not dealing primarily in the real estate business including properties owned by these corporations for investment purposes; as well as properties owned by development corporations as stock and not for sale. Additionally, properties owned by the government agencies in Malaysia may also be categorised as CRE especially involving profit-motivated agencies.

Keywords: *Corporate real estate; interpretation; Malaysian perspective.*

INTRODUCTION

In recent years, business management was more focused on performance improvement through optimum utilisation of resources to ensure business operations are more efficient and productive. Real estate has contributed significantly towards the factors of production in business operations. The emergence of corporate companies involved in property development nowadays in Malaysia has made meaningful contribution to the increasing number of corporate real estate (CRE) available in the market. This is largely due to increased awareness in the corporations on the benefits that they will receive from the properties as investment tools. Hiang Liow & Ingrid (2008) found that these benefits are manifested whereby CRE reflects a corporation's growth and is an essential criterion to achieve the corporation's operational mission, as well as acting as a source of cash in downtime. Additionally, CRE contributes towards the source of capital growth, income from investment, and a source of profit, along with improving stock market performance. Due to all these, Nappi-Choulet et al. (2009) stressed that CRE is now being increasingly adopted as part of the overall investment portfolio and treated as one of the important resources to the corporation after capital, people, technology and information (Hiang Liow & Ingrid, 2008). This phenomenon is widely spread in Malaysia where corporations adopt two core business components which are firstly their traditional core business, and secondly the real estate business as mentioned by Hiang Liow & Ingrid, (2008). Meanwhile, Fauzi et al. (2017) discovered that Malaysians are still at a very early stage of CRE awareness. Fauzi et al. (2016) concurred that business-minded corporations believe that CRE is only a medium to support

business operations and is not the main factor producing profits for the business. Properties owned by government agencies in Malaysia are also categorised as CRE. As such, the definition of CRE should be reviewed to suit this paradigm shift as well as the country's policies. The traditional definition of CRE is still relevant to be used but needs to be expanded accordingly.

CORPORATE REAL ESTATE IN GENERAL

CRE is conventionally known as a factor of production, providing space for the production and delivery of goods and services information (Hiang Liow & Ingrid, 2008). The emergence of the term 'corporate real estate' was pioneered in the early 1980s by Silverman in his corporate real estate handbook. At that time, the term CRE was defined as lands and buildings owned by companies that are not primarily in the real estate business. This definition was used globally to classify corporate real estate. Many researchers also use this definition as a guide to define CRE. However, in the late 1980s Dresdow and Tryce proposed a slightly different definition of CRE to include real estate leased and controlled by corporations (Zaiton Ali et al., 2008). Henceforth, Brown augmented the CRE term to also apply to real estate assets either owned or leased by firms to achieve corporate objectives (Fauzi et al., 2017). Several other researchers adapted the term CRE to mean real estate whether owned or leased by a corporation to achieve the organizational goals (Joroff, Louargand, Lambert, & Becker, 1993; Marwani Mohd Ridzuan & Zaiton Ali, 2012; Roulac, 2001; Zaiton Ali et al., 2008) defined CRE as a function of physical work, production and customer engagement environments that look more similar to what have been determined earlier.

Recently, the definition of CRE is more directly related to achieving primary business missions. This is apparent where CRE is construed as corporate property including industrial, office and retail space used for business purposes, and are the main contributors for the production activities of the corporation (Nappi-Choulet et al., 2009). Hiang Liow & Ingrid (2008) postulated that CRE has now taken on higher levels of importance as the "fifth corporate resource" after capital, people, technology and information. CRE is also frequently defined as all real estate owned by corporations regardless of whether they are held for utility or held purely as investments. This definition overlooks leasehold CRE altogether (Heywood & Kenley, 2013). Other definitions of CRE see them as real properties accommodating the productive or business activities of an organization whether their own or held under leases; and consequently manages these real estate incidental to its business objectives where the primary business is not real estate (Heywood & Kenley, 2013). Another definition put forward by Ziemba et al. (2015) is property used for operational activities of an enterprise. In summary, all the definitions given above reflect similar meanings. At the early stages, there were no specific definitions on CRE related to several other management areas as compared to the recent research development on CRE. From all the above definitions, an existing CRE may be concluded thus:

> *"Real estate owned by corporations regardless of whether they are held for utility or purely as investments, overlooking leasehold CRE altogether, to achieve their business objectives"*

METHODOLOGY

However, in light of the paradigm shift in the business corporations and government policies in Malaysia, the definitions above are still not doing much in determining the CRE. Several questions arose on whether:

- The CRE is viewed as similar to the general definitions of CRE gathered from previous studies; or
- The developers' properties can be categorised as CRE; and
- The properties owned by government agencies can be categorised as CRE.

In conjunction with these arguments, an investigation to determine the CRE from the Malaysian perspective was conducted through semi-structured interviews and open-ended questions with seven real estate experts. It includes identifying whether developer's properties and properties owned by government agencies can be categorised as CRE.

The participants selected are recorded as P1 to P7 in Table 1 due to respect and the confidentiality nature of the information. The semi-structured interview sessions were conducted face-to-face. During interview sessions, the information was recorded through the conventional methods of handwriting and using voice recorders. The venues for the interview sessions were pleasant and comfortable for the participants. This helps to create a relaxing and amiable recording environment for both parties. However, one of the participants was not available for the interview session as he was outstation for several months. Initially, it was decided to exclude that particular participant but due to the small number of available CRE experts in Malaysia, the researcher decided to proceed with open-ended questions that were emailed to him. The response received was also through email. The queries on answers received were communicated through email.

This research demonstrated the application of non-probability sampling technique of purposive sampling as the best sampling method applicable. This is due to the exploratory nature of the study and the ambiguity on the representativeness. In addition, purposive sampling was selected as the research requires data collected from experts who are directly involved in and managing green CRE. According to Sarantakos (2005) in general purposive sampling is also known as judgmental sampling. It is because the choice of respondents is guided by the researcher's judgment. In this technique, researchers purposely choose subjects who, in their opinion, are relevant to the research.

The criteria for the selection of participants were decided by discussing with one of the real estate experts who was also directly involved in managing a green building. These criteria have also been modified twice due to the lack of understanding on CRE by real estate experts in Malaysia. The final criteria adopted are: CRE managers who directly manage green CRE office and who have more than ten years' experience. Hence, seven participants were selected for further investigation where all of them are real estate experts and also directly involved in managing green buildings.

Table 1. Background of participants

Participants	Years of experience
P1	27
P2	32
P3	27
P4	30
P5	30
P6	22
P7	21

Since the data was collected through semi-structured interviews and open-ended questions, the researchers transcribed and analysed responses using qualitative data analysis software (Atlas.ti). The interview transcript is analysed by using content analysis with a word-based and code-based approaches. Both approaches are applied to minimize weaknesses inherent in using a single method of data analysis. It is usual practice for researchers to analyse the interview questions to form themes as the data obtained from the interview transcripts is raw and requires to be analysed and arranged systematically (Mohd Tobi, 2014).

RESULTS AND DISCUSSION

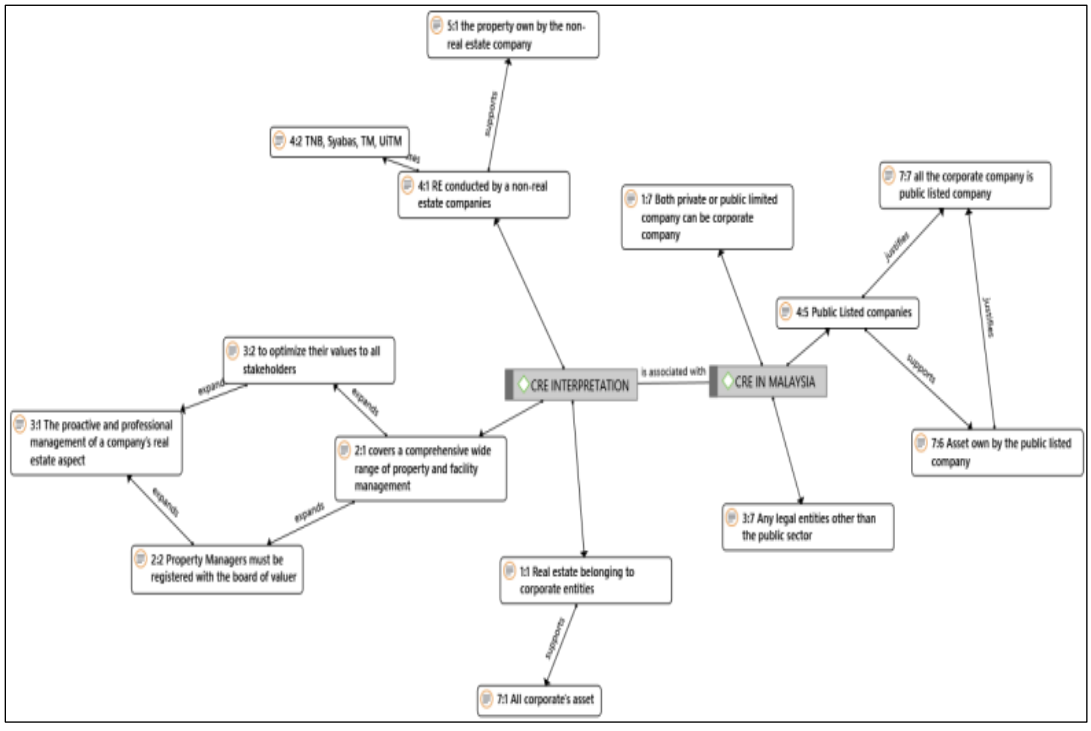

Figure 1. The CRE interpretation in Malaysia

The CRE Interpretation

Figure 1 above shows the CRE interpretation from the viewpoints of real estate experts in Malaysia. As evidenced in Figure 1, CRE is known as real estate belonging to the corporate entities (P1:Q1). This quotation is supported by P7:Q1 who also shares the same opinion

whereby the CRE is interpreted as corporate assets. P4:Q1 expanded this by noting that CRE is real estate managed by non-real estate companies whether it is owned or leased. In concurrence, P5:Q1 defined CRE as properties owned by non-real estate companies. This view concurs with the definitions found in Silverman (1987). Meanwhile, P2:Q1 added that CRE covers a comprehensive range of property and facilities management as seen in quotation 2 which insisted that CRE managers should be registered with the Board of Valuers, Appraisers, Estate Agents and Property Managers. This is because CRE functions to optimize corporate business values notably to all stakeholders as mentioned by P3:Q2. As such, proactive and professional real estate management by companies is crucial.

From the investigation, it was found that CRE in Malaysia involves both private and public limited companies since both are classified as corporate companies as underlined by P1:Q7. P7:Q6 highlighted that properties owned by public listed companies in Malaysia may be classified as CRE. This is because all corporate companies are public listed companies. His views are supported by P3:Q7 who stated that any properties owned or leased by legal entities other than the public sector can be categorized as CRE.

The Developer's Company

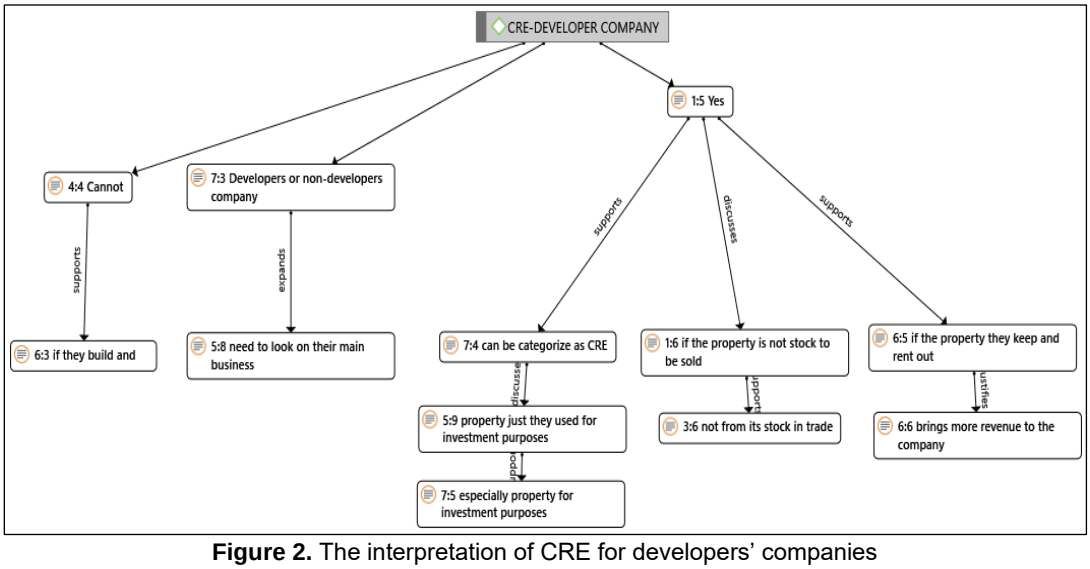

Figure 2. The interpretation of CRE for developers' companies

The results in Figure 2 reveal that developers' companies may also be categorized as CRE as recorded in P1:Q5. P7:Q4 supported this statement but cautioned that the CRE definition can only be applied for those properties that they use for investment purposes; which resonated with the opinion shared by P5:Q9. This is closely concurred by P1:Q6 who mentioned that CRE may be applied to properties owned by the developers if the properties are not stock for sale; as highlighted by P3:Q6 who asserted that the CRE should be properties which are not from the developers' stock in trade. P6:Q5 emphasized that CRE can be used on the developers' properties that they retain and rent out as those properties bring more revenue to the company (P6:Q6).

The Government Agency

Bringing to the fore, the properties owned or leased by government agencies or corporations can be categorized as CRE (P1:Q2). P5:Q6, P7:Q2, P3:Q3 and P6:Q2 were all in agreement that properties owned or leased by government agencies or government-linked companies (GLCs) can be categorized as CRE. Some examples given by P5:Q5 are the Malaysian Inland Revenue Board (LHDN) and Tenaga Nasional Berhad (TNB). P6:Q1 reminded that CRE management has already been introduced by the 4th Malaysian Prime Minister on all government properties. This shows that government properties can be categorized as CRE the same as other corporate properties specifically profit-oriented agencies (P3:Q4 and P5:Q10).

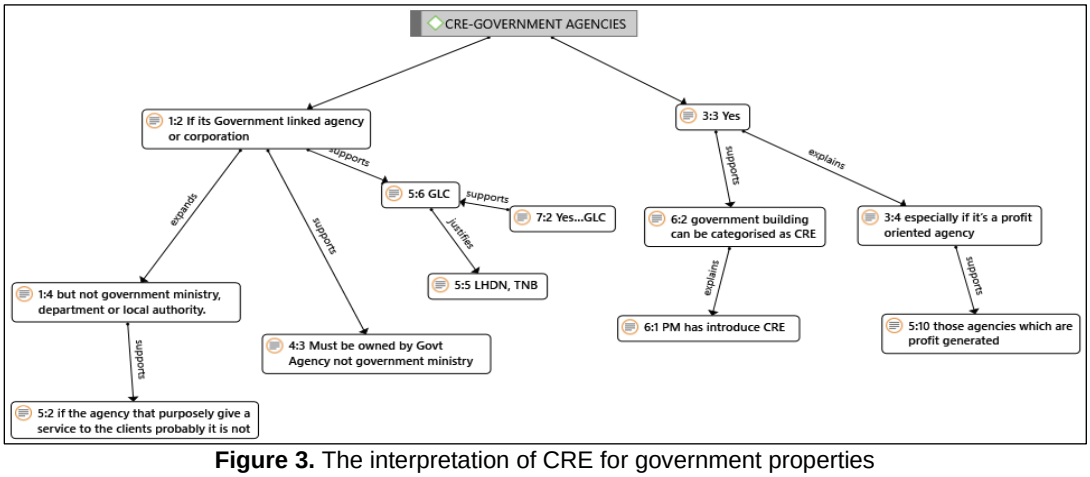

Figure 3. The interpretation of CRE for government properties

In this instance, P4:Q3 stressed that the CRE must be owned by government agencies, not by the government ministries as emphasized by P1:Q4 that CRE should exclude properties owned or leased by government ministries, departments and local authorities. P5:Q2 underlined that if an agency's function is to provide service to the clients, the properties belonging to them are not CRE.

CONCLUSION

This study has established comprehensive reviews on the definitions of CRE. It captures a dynamic response on the CRE interpretations by Malaysian experts including the determination of CRE on government properties as well as developers' properties. Hence, it is concluded that CRE may be defined as:

> "Corporate assets owned or leased by non-real estate companies including developers' properties in which the properties are used for investment purposes and not as stock for trade. CRE also involves properties owned by government agencies especially by profit-oriented agencies. Not only that, in order to determine the CRE, both private companies and public listed companies may be used as references with additional analysis on their overall business and assets functions."

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SHOPPING EXPERIENCE TOWARDS SHARIAH COMPLIANCE IN ISLAMIC BOUTIQUE DESIGN

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Abstract
Islam can place women in a dilemmatic situation, as they are required to follow the *awrah* (Quran 7:26 and 24:31) but are unable to comply with this in many retail establishments. The *awrah* are the parts of the body that should be kept covered when in view of non-*mahram men (not blood related), however m*any Islamic clothing retailers do not place these considerations at the forefront of their design layouts, and therefore make it possible for non-*mahram* men to view Muslim women's *awrah,* leading to haram situations. Malaysia is currently experiencing a paradigm shift, where boutique shop owners are looking to adopt Islamic concepts and principles in planning their retail stores. Clear and articulated guidelines for the strategic planning of these facilities are vital in supporting shop owners in addressing the needs of their female Muslim customers. The procedure for this research will take the form of a two-part, qualitative approach. Firstly, focusing on the criteria of Sharia Compliance, through performing a detailed literature review of pertinent source materials from the Quran, Sunnah and hadiths regarding Islamic law. The second stage of research involves the conducting of Interviews with boutique retail-store owners, in order to identify the issues which are directly applicable the Muslim customers in their establishments, and which could be solved through sharia compliant design. Once the results of the literature review and interviews have been complied, a collection of detailed and comprehensive design principles can be established, for direct implementation into retail store interior planning. These guidelines will allow shop owners and interior designers to successfully address all concerns of their Muslim customers relating to Sharia compliance, thus creating a higher quality shopping environment, improving their standing in the market, and providing an optimal retail experience for female Muslims.

Keywords: *Shopping experience; Islamic boutique design; Shariah compliance.*

INTRODUCTION

Through information gathered from literature reviews and the interview of involved retail store owners, this paper establishes a set of comprehensive design principles, for use as reference in the planning of Shariah compliant retail stores. This provides a solution to the issues faced by female Muslim customers, who wish to abide by the *awrah* (Quran 7:26 and 24:31) while shopping.

Shoppers Patterns and Issues

Several studies have been made and resulted to a positive store environment, for example an attractive layout, effective display, pleasant music and scent, and it also may influence the customers to stay longer and have plans to revisit the store. This will make the relationships between customers and retailers stronger (Baker et al., 2002). Consequently, retailers must differentiate themselves by meeting their customers' needs better than their competitors.

Another point where, the importance of store atmosphere as a determinant for store patronage, and these concepts are likely consistent when applied to Islamic-specific fundamentals. Muslim women nowadays accentuate the quality of life laterally with performing the Islamic ways of life. This has been given examples where, adopting Islamic

cultures, within the local traditions or values, could be attractive to Muslim consumers' niche markets and in predominantly Muslim markets (McDaniel and Burnett, 1990) concluded that, to give *This*-give a better understanding that religious people need more humane treatment as compared to another store attribute.

Third point, appreciating the Islamic values and the growth of religious conservatism in markets like Malaysia gives different opportunities in offering more "Islamically" customized products and services by the retailers (Fauzi et al., 2018). In adopting these principles in the store design, retailers could improve their customer relationships, and in doing so improve the success of their business.

LITERATURE REVIEW

In Islamic principles and guidelines focusing to retail store design, as well as Islamic based on the Shariah laws laid in the Quran and Sunnah, there are no specific rules as to the architectural design of a building, however, a few guiding principles are translated, discussed, resolved and stated according to Quran and Sunnah (Othman et al., 2014; Omer, 2010; and Mortada, 2011) that:

a) Privacy; a safe and private space for personal and family's sanctuary.
b) Modesty: a home that provides spaces for religious rituals and activities, further defined by humility in design through economical and sustainable design.
c) Hospitality: a house with chances to extend hospitality to its neighbours and enhance the relationships with others.

It was targeted there will be a growth of Muslims reaching 2050 for about 29.7 billion per cent (Razalli, 2020). The needs of not merely for halal's products, hence it worth of changing the lifestyle towards peace and harmony by implementing Shariah compliance.

The three individual principles with specific guidelines for interior design and interior architecture are:

a) Visual Privacy

Optimum visual privacy is a predominant objective of design to ensure female family members' safety and privacy within Muslim homes (Al-Kodmany, 1999). This can be applied in retail store where majority of the shopping mall or retail is occupied by the women. With that, women's privacy is prior to those public areas as well. Design interventions and innovation, can be created to the privacy's matter, for example, the location and design of entrance doors, windows and openings placement and sizes, the control of building height and balcony, and the incorporated internal courtyard and gendered spaces (Bahamann, 1987). The visual privacy takes place from the beginning; from the entrance. The most obvious demarcation between the public and private realms is the front entrance door. In traditional Muslim homes, entrance door is placed away from the main street and indirectly facing the opposite neighbours (Bekleyen and Dalk lç, 2011) refer to Figure 1. So, in new design innovation to retail, the entrance can be created accordingly.

Another crucial criterion in maintaining visual privacy in Muslim homes design is the creation of gendered space, as agreed to Mortada (2011) and Zulkiplee (2016; 2015). Gendered space is used to provide additional sound transmission control based on exclusive rooms for male or females separated space circulation and corridors to ensure the acoustical privacy is maintained (Zulkiplee, 2015).

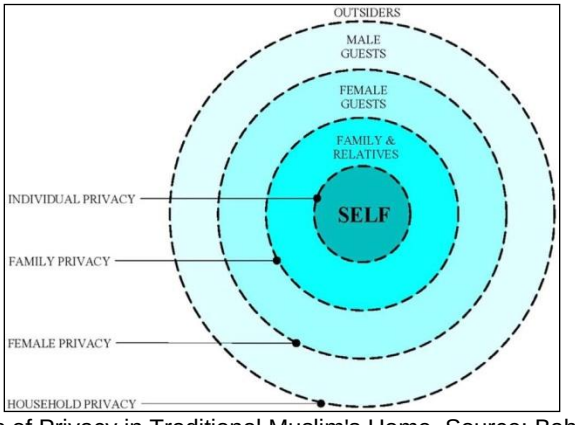

Figure 1. Layers of Privacy in Traditional Muslim's Home. Source: Bahammam (1987)

b) Modesty

Modesty is part of the element principle in Islamic architecture. *Modesty or "haya" in Arabic is a personality trait, where a person remains humble and polite without having lack of self-esteem or self-confidence (Azizah and Putri, 2013).* This can be classified into two main categories (Mortada, 2011):

1. Physical modesty in terms of design humility and dress-code.
2. Inner Modesty in terms of internal perception which is self-improvement or self-motivation and social interaction which are shyness, humility and politeness.

c) Hospitality

Hospitality is also important, where in Islam we are taught to give comfort to human each other in practicing life and not chaos. *Muslim houses are required to provide a space for prayer (Omer, 2010*). It can be concluded that the Islamic hospitality building design should be the product of the Islamic beliefs and the value of the occupants (Abdul Majida et al., 2015).

Key Building Design Principle Inspired by the Teachings of the Shariah Law

There are six elements of design principles in building construction and materials (Noorul Huda & Anuar Talib, 2013):

Door

The private rooms entrance door should not be designed to face one another. The doors and windows should be discreet, offset and the placement is not adjacent to one another.

Window

The location of rooms is recommended not to be on the ground floor. If it is on the ground floor of the building, it is critical to place the windows because referring to the principles, the windows should be placed at 1.73 meters from the ground and above eye-level in order to provide privacy. According to Umar's calculation, the ground window should be 2.5m from above the ground level (Yusof, 2016).

Interior Design

The interior decorations should not be featuring any human form, and it is encouraged to use Islamic calligraphy art in the building instead.

Room and Toilet

The position of bed and toilet should not be facing the *qibla* direction and also bath and toilet should be separated. The toilet entrance should have a door that swings to the right to make the users enter using the left leg.

It is taught in Islam that it is important to practice cleanliness in our daily life. Toilet, for example, is a place where many types of breed and multiply germs that cause infection. Therefore, Islam has provided great consideration in usage of toilet in daily life. (Yusof, 2016).

The toilet door design should be pushed with right hand and need to open towards inside. It will then result that a person can unconsciously will enter toilet with left foot first. (Hadith: Narrated Ibn Majah).

Materials

The material choices should consider to provide acoustical privacy especially between the toilet and the room and between rooms. These environments need high absorption quality to promote the privacy necessary. One of the human feelings is to feel shame from exposing private issues. Respecting and protecting these feelings are mandatory in designing such spaces (Mahmoud, 2019).

Wastage

Another important consideration is the wastage aspect. The building design should implement energy efficient and passive design strategies to encourage savings in the operation of the building. Saving energy can relate with Shariah guidelines on savings and preventing wastefulness.

Aim and Objectives

Several questions were raised to these issues before objectives implementation, of what are the Shariah Compliance aspects and elements that can be considered in design? And is it possible to apply Shariah Compliance elements in Retail Design?

Therefore, the aim of this shopping experience trail is to establish the needs and requirement of retail design according to Shariah Compliant. Where, the objectives continuing to this trail as:

1. To determine the Shariah compliant elements to be applied in Design.
2. To investigate the application of Shariah compliance elements in Retail Design.

RESEARCH METHODOLOGY

A three-part method of data collection was implemented in formulating the content of the design principles list. This consisted of literature review, observational analysis and an experienced party interview process.

The data or body information from literature review (Abdul Majida et al., 2015) which is the element of this study is performed through an in-depth content analysis and examination of the Quran and Hadith. They were selected as the source material due to the foundational knowledge of Islamic principles that are revealed within their literature. Other related secondary data was included through comprehensive research reviews, to assist in providing an inclusive background and understanding of all current philosophies on the subject of Sharia compliance, and also to highlight the contrasts between recent and earlier studies.

A qualitative research approach using both observational and interview techniques was performed on Islamic based retailers in Malaysia. Researchers attended two retail stores which were selected as the case studies due to their majority Muslim clientele. The Case studies were then completed for each individual store, assessing all aspects of the current architectural interior plans of the buildings. Guidance for the observational details was taken from the literature reviews conducted prior, to ensure that the design features observed remained aligned to the topic.

Interview questions were formulated from the body information study of the source of literature reviews on shariah compliance and retail design. The interviews were conducted to three respondents, where two of them are from two different store owners. The interviews were take place at their own retail store. The interviews were including questioning the store owners, for their thoughts on the subject of Shariah compliance for their retail store as well as their customers. This semi-structured approach is intended to supplement the observational interior design study, through gathering the personal opinions and experiences of those directly affected by the issue.

The data from all three studies was analysed and compiled. Any data that corresponded across multiple study types was determined as being supported and validated, and was thus included in the design requirements list, to be subsequently reviewed by experts.

RESULTS AND FINDINGS

Through the compilation and comparison of data from the various research methods, it is determined that there are several definite elements that are able to be applied in design to produce a Sharia compliant retail store.

Corresponding findings, which correlate between observational data, interview information and the secondary study reviews, enable a list of multi-sourced validated guidelines to be formulated, based on the opinions of subject matter experts, and verified against the teachings of the Quran and Hadith.

It was determined that the basis of all research should be referred back to the knowledge imparted in the guiding texts (Quran and Hadith), as only these sources can determine whether Sharia compliance has truly been achieved for a retail establishment.

The aspects and elements that can be implemented in design are:

1. Simplicity in Islam
2. Islamic Art
3. Privacy in Buildings and between Muslims
4. Humility (External and Internal Modesty)
5. Hospitality for Users
6. Building Elements with Islamic understandings
7. Store Atmosphere and Attributes

The retail stores selected for observation were found to comply with merely a few of the Sharia compliance elements and characteristics, therefore they cannot be considered as truly Shariah compliant establishments, as some of the major criteria were not offered or applied in the store interior designs. Items such as - no separated areas for men and women, the non-existence of prayer rooms for customers and a lack of general facilities, meant that both stores were unable to fully match the proposed list of Sharia compliant requirements.

The design criteria list intends to enhance the shopping experience for Muslim women, through improving their safety and comfort values via the integration of Islamic principles into the commercial sector. Accordingly, Sharia law and compliance can be accomplished if the proposed list of guidelines below can be implemented:

<u>Sharia Compliant Retail Store Design Criteria</u>

- Display design must follow Islamic law (example: the use of mannequin)
- Stores need to make customers wear proper when enter the store
- Store design must have spaces for female and male separately according to type of spaces
- Simplicity in design and material choice
- Female priority in spaces and design
- Interior decoration must be allowed according to Islamic law
- Every building must have prayer room as one of the facilities
- Interior and exterior design of the store must be well-designed
- Layout spatial organisation is important based on priority and needs
- The store design must make privacy between customers, staff and neighbours as priority
- The location & design of entrance door, windows must follow Islamic rules
- Building design and material choice must show Islamic value
- Store needs to be kept clean, comfortable and pleasant scent and background music
- Pleasant appearance of the whole building

- Cultural features is needed if the store's concept are related to culture
- Store must provide facilities & services for customers & staff
- Product must be allocated accordingly for ease of shopping
- Store directory & product information is important for customers
- Store location must be suitable for the type of store
- Toilet placement in the store must be properly placed

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CRITICAL SUCCESS FACTORS (CSFs) FOR QUALITY FACILITIES MANAGEMENT (FM) IN MANAGING APARTMENTS IN MALAYSIA

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Abstract
Disputes between residents and the management managing an apartment is an unresolved problem. Disputes may affect the quality and sustainability of the apartment's physical structure. Improvement of the apartment facilities management (FM) is needed for quality and sustainable urban living. The purpose of this paper is to examine the critical success factors (CSFs) for quality facilities management (FM) in managing apartments in Malaysia by initially identifying what the critical considerations are. The data for this preliminary study was obtained from random samples of 52 respondents involving owners' frontline representatives from various apartments' official managing bodies in Selangor, Malaysia. The reliability and validity of the instruments were assessed by experts from academia and the industry. The results provided evidence that the survey instrument was reliable with an overall Cronbach's alpha of more than 0.900. It was found that respondents felt that the expectation of residents was perceived as the highest crucial factor compared to other factors. In conclusion, the results revealed that the potential constructs would be developed as key performance indicators (KPIs) for quality facilities management (FM) in apartments, specifically in the local region.

Keywords: *Critical success factors (CSFs); management body; questionnaire; facilities management (FM).*

INTRODUCTION

Urban population growth has rapidly affected the rise in demand for housing stocks, with North America, Latin America and the Caribbean, Europe and Oceania leading the most urbanized countries (United Nations, 2018). Not surprisingly, Asia has also experienced population growth in major urban cities. Employment opportunities that are widespread in urban cities are the choice of people seeking livelihoods, and this contributes to the increase in the percentage of urban population growth.

Due to growing populations and the scarcity of land, urban cities cannot grow horizontally. Thus, developers, particularly in major urban cities, are concentrating more on supplying high-rise housing. Some such developments are provided with top-notch facilities together with common areas (Musa et al., 2015) such as parking areas, lighting, lifts, swimming pools, gyms and other common facilities. These facilities, if adequate management and maintenance are provided, create and sustain a healthy living environment (Sia et al., 2017). However, most residents of high-rise housing developments such as apartments do not realize the importance of good building management until their building and its common facilities have deteriorated (Meikeng, 2016; Sia et al., 2017). Many scholars agree that the neglect to take care of a building may cause building quality deficiencies (Ganisen et al., 2015). This setback increases cost, leads to unreliable cost estimates (Ali et al., 2010, Ganisen et al., 2015) and compromises health and safety (Yau et al., 2008; Ganisen et al., 2015).

The existence of disputes between residents and the management results from significant differences in satisfaction levels between residents towards management. These findings were discovered in the early 1990s (Hussain, 1999). The latter researcher's findings have been supported by Che-Ani et al. (2010) and Rahman et al. (2015) all of whom have consistently agreed that the disputes caused failures by the residents to keep up the service charges payment paid monthly to the management. In turn, this leads to insufficient funds to run the maintenance and management of the building, thus affecting the capacity of the management to provide quality facilities management (FM) services. This scenario will lead to the deterioration of the building's quality (Ganisen et al., 2015; Donoso & Elsinga, 2016, Sia et al., 2017).

Critical factors determine the survival and success of an organization or business. As far as the researchers are concerned, the first paper on the CSF approach was first authored by Daniel (1961). However, Rochart, (1979) was responsible for popularizing the approach. Since then, many researchers and industry players in the business and marketing fields have utilized the approach in research and business. However, little ink has been spilt on CSFs in FM, specifically on apartments. These CSFs include residents' expectations, staff competence, learning and growth, finances, management commitment and support, and pre-conditions during the developer transition period.

CSFs are the limited number of areas that, if satisfactory, will ensure the successful competitive performance of the organisation (Rochart & Bullen, 1981). These few areas are where "things must go right" by the organisation in order to flourish (Rochart & Bullen, 1981). Agreements from other researchers claim that CSFs could improve the performance of the management process (Jefferies et al., 2002) and help management prioritize key areas to ensure success under the constraints of time, cost and resources (Kalumbu et al., 2016). Furthermore, through the addressing and practicing of key areas in management planning and action, it will also ensure successful management (Yang et al., 2009; Aueaungkul, 2013). In the FM organisational context, the application of CSFs could improve maintenance management practices (Zulkarnain et al., 2011). Correspondingly, CSFs will reduce the probability of failure during the execution of the project when all risks are well managed (Mukelas et al., 2012). Therefore, CSFs are activity areas that should receive constant and careful attention from an organization aiming to achieve, improve and sustain their business objectives and goals.

This study purposely focuses on privately-supplied medium-cost apartments with selling prices ranging between RM80,001 to RM300,000 (Jabatan Perumahan Negara, 2011) managed by official management bodies in Selangor, Malaysia. Little attention for quality management has been paid to this type of housing as more focus has been given to low-cost housing following the Malaysian Housing Policy 2.0, launched on 8th January 2019. In this limited space, this paper attempts to examine the CSFs for quality FM in managing apartments in Malaysia by initially identifying what the critical considerations are.

LITERATURE REVIEW

This section provides the literature review of this study which consists of residents' expectations, staff competence, learning and growth, finances, management commitment and support, and pre-conditions during the developer transition period as tabulated in Table 1. The details are explained as follows: -

Residents' Expectations

The residents' expectations require management bodies or organisations who are officially appointed by residents to consider their needs. In practice, it is the residents or owners who usually use the building on a daily basis and take part in the day-to-day management of its affairs. They are the ones who benefit the most from good management and lose the most from poor management (Gao, 2015). Thus, they represent a significant factor in efficient repair and maintenance services for the organisation to provide quality goods and services, effective delivery, and overall resident satisfaction (Amaratunga & Baldry, 2003). Therefore, their role is the key to the quality of FM.

Staff Competence

Residents or owners of the unit parcel in the apartments are not technically or professionally qualified to take responsibility for any property-related decisions. Managing the facilities in such developments requires expert manpower, ensuring value-for-money services and the liability of the owner for the proper FM of their buildings (Hui, 2005). The personnel act as the owners' frontline representatives as they deal with residents on a daily basis compared to committee members of the management body who work part time and on a voluntary basis.

Wang et al. (2014) found that staff competence promotes professional levels of service and improves the quality of repair and maintenance operations in Taiwan and China. Therefore, a personnel qualification certification system is necessary for any individual aspiring to join the repair and maintenance operations aspect specifically. Previous studies found that skilled and experienced personnel could provide quality service delivery in terms of repair and maintenance service activities (Tan et al., 2014). Another study by Akinsola et al. (2012) revealed that adequate and skilful personnel may reduce job delays by means of the team promptly responding to complaints received. Hence, staff competence gives roles per demands of an organisation for quality management.

Learning and Growth

The learning and growth factor is how well the organization learns and improves its performance continuously. The abilities of the employees (Perkins et al., 2014) and technological advancements (Assaf et al., 2010; Lin & Su, 2013) are needed to adapt to changes such as changes in the policies of authorities as well as environmental changes. Hence, organisations focusing on quality management must create long-term growth and improve continuously.

Financial Resources

Financial factors are essential for the survival of the FM business, notably managing and running repair and maintenance activities towards sustaining the building. In apartment development, service charge fees are essential for various management tasks, particularly for administration and utilities, necessary facilities, support facilities, repair and maintenance operations, sinking funds and etc. The fees are collected from the residents or owners of the unit parcel in the development (Hussain, 1999). The challenge of the management body is to

ensure the residents or owners consistently pay the fees and minimize the amount of arrears from defaulters (Hussain, 1999; Syah Ali et al., 2010). Insufficient funds may arise improper building and facilities management, and this, in turn, may increase the likelihood of health and safety risks (Waziri, 2016). Therefore, organisations should creatively manage the arrears from defaulters, maintenance budgeting as well as prioritize which activities should be the concern of the management.

Management Commitment and Support

The top management are the owners' frontline representatives consisting of the chairman, secretary, treasurer and a few committee members. They are appointed by the residents or owners of the unit parcels by voting during annual general meetings (AGM). They are formed as the owners' representatives to arrange corresponding repair works (Lai & Lai, 2013). They may manage by themselves or appoint third parties to manage on their behalf in exchange for certain fees. Quality management improvement is a necessity in maintaining FM business and building trust among the management bodies and residents (Assaf et al., 2010; Tucker et al., 2014; Vergara et al., 2019). Therefore, management bodies are the key drivers of quality management as they are responsible for creating and communicating a vision for quality management (Au-Yong et al., 2017). Besides that, response time towards complaints impact the satisfaction of residents (Akinsola et al., 2012; Tan et al., 2014; Vergara et al., 2019). The faster the response, the higher the residents' satisfaction.

Pre-condition During Developer Transition Period

In a real estate setting, a number of previous researches have emphasized on design inadequacies which affected the cost-effectiveness of the long-term operational maintenance activities of the building. In particular Sajan's (2015) study on the impact of design upon the satisfaction of apartment living in Sydney using a face-to-face household survey found that the primary cause of resident dissatisfaction is related to poor design, possible inconsistencies in certification, and inadequate building regulation. Surprisingly, although Sajan's work involves buildings with more than ten years of construction age, the issues of design still persist. Additionally, efforts at identifying operation and maintenance concerns during the design stage have an influence on achieving the sustainability of the building (Ahmed, 2012; Ganisen et al., 2015; Adewunmi et al., 2016); (Fatayer et al., 2019). Thus, ignorance of this may result in high operational maintenance costs in the future (De Silva et al., 2012).

Likewise, quality materials and specifications compliance to good construction practices also need to be kept in mind. Ignoring this leads to faulty construction which may have an impact on early building deterioration (Assaf et al., 1995; Waziri, 2016). It is, however, the responsibility of the design and construction professionals through adequate supervision to attenuate the costs of maintenance during the construction of apartments. Therefore, a lack of consideration of this perspective in the early stages of design could lead to building decay which, in turn, could affect the sustainability of the neighbourhood.

METHODOLOGY

This article involved a preliminary study conducted in small-scale studies to test questionnaires in order to minimize the likelihood of respondents having problems in

answering the questions and to allow for the assessment of the validity and reliability of the collected data (Saunders et al., 2016). To determine the perception of how critical these success factors were by those responsible for quality facilities management in managing apartments, this study adopted a deductive approach with a simple random sampling method for data collection which most of the researchers in this field used (Anthony et al., 2002; Lai & Pang, 2010). The survey was conducted in major urban cities in Selangor, Malaysia and took place on October and November 2018.

Apartments were chosen as they are complex housing managements (Silva & Ranasinghe, 2010) and most building typology failures are concentrated on that type of housing compared to landed-type housing (Carretero-Ayuso et al., 2017). Most apartments aged more than ten (10) years and above need more attention to wear and tear (Kim et al., 2019). Especially in tropical conditions such in Malaysia, the sustainability of buildings can be managed if the management properly controls their maintainability risks (De Silva et al., 2016). Therefore, it is essential for the management to identify CSFs to sustain their apartments.

Prior to the study, six (6) experts and potential respondents who were experienced in apartments development were selected and they were given questionnaires to be critically analysed and validated. Three (3) academicians consisting of senior lecturers and associate professors who were specialists in property management or real estate in local universities as well as three (3) industry players experienced in managing such development were asked to assess and give input on the relevancy of the contents and the appropriateness of the items adapted to measure the constructs. Corrections were made on the basis of the given recommendations in the questionnaire before conducting the survey. The survey was conducted using a face to face survey as utilized by Lai & Lai, (2013) and Sajan, (2015) in a similar field. After the collection of the survey, the data was analysed using SPSS Version 23.0. The analysis of data from the questionnaires' responses provided precise data from which the tables were produced.

Table 1. Quality facility management constructs and their measurements items

Construct	Item	Adapt
Residents Expectation (R)	1. Residents' needs	Procurement Executives' Association, (1998); Fotopoulos & Psomas, (2009)
	2. Good relationship with residents	Motwani, (2001)
	3. Effective communication	Zutshi & Sohal, (2004); Cho and Lee (2011); Tan et al. (2014)
	4. Awareness on charges & fees	Ho & Gao (2013); Rahman et al. (2015)
	5. Awareness on house rules	Ho & Gao (2013); Rahman et al. (2015)
	6. Awareness on acts	Ho & Gao (2013); Rahman et al. (2015)
	7. Awareness on building maintenance	Ho & Gao (2013); Rahman et al. (2015)
Staff Competence (CS)	1.Maintenance experienced	Tan et al. (2014)
	2.Professional membership	Tan et al. (2014)
	3.Ability to handle entire management's complexity	Pintelon & Van Puyvelde, (1997); Hui (2005)
Learning & Growth (LG)	1. Training	Vijverberg (2003); Zutshi and Sohal (2004); Talib & Rahman, (2010); Shenawy et al., (2007); (National Housing Federation, 2011); Tan et al. (2014); Alia et al., (2015); Fatemi et al., (2016)
	2. Continuous improvement	Croal et al., (2003); Kempton, (2006); Talib & Rahman, (2010); Sharp & Jones (2012); (Tucker et al., 2014)
	3. Technology utilisation	Sharp and Jones (2003); Cardellino and Finch (2006); Tucker et al. (2014); (Babatunde & Ajayi, 2018)

Construct	Item	Adapt
	4. Cultural changes	Zutshi and Sohal (2004); Cho and Lee (2011); Tan et al. (2014); Hui, (2005); Abdullah Sani et al. (2012)
	5. Lesson learnt	Zutshi and Sohal (2004)
Financial Resources (F)	1.Sufficient fund	Tan et al. (2014); Tucker et al. (2014)
	2.Charges comparable with facilities	Tan et al. (2014); Tucker et al. (2014)
Management Commitment & Support (MCS)	1. Strategic management knowledge	Fotopoulus & Psomas (2009)
	2. Operation management knowledge	Hui (2005)
	3. Delegate duties	Hoang et al. (2006)
	4. Systematic documents	Hoang et al. (2006)
	5. House rules communicated clearly to residents	Hoang et al. (2006)
	6. Incentives	(Abdullah Saleh et al., 2015)
	7. Collective ownership	Ho & Gao (2013)
Pre-condition during Developer Transition Period (DTP)	1. Design & layout	Yang et al., (2009); Easthope, Warnken, Sherry, Coiacetto et al.,(2014); Johnston & Too, (2015)
	2. Quality construction	Yang et al., (2009); Easthope & Randolph, (2016); Johnston, (2016); Easthope et al., (2014)
	3. Handover document	Yang et al., (2009); Easthope et al., (2014); Johnston, (2016)

(Source: Authors' Sources)

The Instrument

The instrument was divided into three (3) sections which were A, B and C. Only section A and B will be discussed. Section A is related to the demographics of the respondents whilst Section B was used to measure the critical success factor (CSFs) constructs consisting of management commitment and support, staff competency, residents' expectations, learning and growth, financial resources, and pre-condition during the developer's transition phase. A five-point Likert-type scale was used for the above six (6) constructs with thirty (30) items where 5 = Very Critical, 4 = Critical, 3 = Neutral, 2 = Not Critical and 1 = Not Very Critical, and this has also previously been used by real estate researchers (Lai & Pang, 2010; Lai & Lai, 2013; Tan et al., 2014).

Validity and Reliability

The reliability test provides evidence of the high reliability of an instrument and the acceptance range for the Cronbach's alpha value of 0.600 and above. Higher values show higher inter-item consistency and show the higher reliability of an instrument (Sekaran et al., 2010).

Table 2. Reliability Test Construct

	Scale	Item	α
1	Management Commitment & Support	7	0.973
2	Staff Competence	3	0.974
3	Residents' Expectation	7	0.955
4	Learning and Growth	5	0.960
5	Financial Resources	2	0.911
6	Pre-Condition During Developer's Transition Period	3	0.924

The results of the reliability test in Table shows that the values of the Cronbach's alpha (α) are all above 0.900. However, the desired threshold value was 0.700. Therefore, it can be said that the selected constructs of the success factors in this study were reliable. Table also

shows that a high degree of reliability was found between CSF measures. The average measure of Intraclass Correlation Coefficient (ICC) was 0.924 with a 95% confidence interval from 0.876 to 0.958 ($F(34,136)=13.193$, $p<0.001$ as shown in
Table .

Table 3. Intraclass Correlation Coefficient

		95% Confidence Interval		F Test with True Value 0			
	Intraclass Correlation[b]	Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.709[a]	.585	.819	13.193	34	136	0.000
Average Measures	.924[c]	.876	.958	13.193	34	136	0.000

Notes: Two-way mixed effects model where people effects are random and measure effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent because it is not estimable otherwise.

Respondents Profile

The study should be tested with a group as similar as possible to the final population in the sample (Saunders et al., 2016). Most literature related to CSFs suggest that the respondents should be comprised of decision makers as they have a decision maker's intuition (Grunert & Ellegaard, 1992); therefore, the group involved comprised of the chairman, secretary and treasurer of the official management body of medium cost apartments.

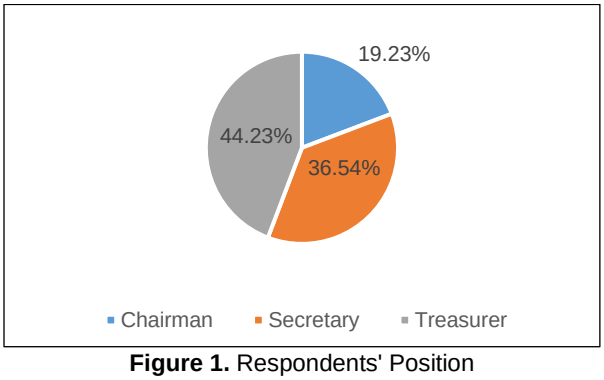

Figure 1. Respondents' Position

Figure depicts the respondents' positions where the majority of the respondents are treasurers of the management body (44.23%), secretaries at 36.54% and chairman with a percentage of 36.54%. Most of the respondents had less than five years working experience with 15.38% for chairman, 25% from secretaries and 26.92% from treasurers. Working experience within six to ten years showed chairman at 3.85% and secretary and treasurer respectively with 9.62% and 17.31%. Only one respondent had more than ten years of experience with the secretary position. The survey was done in three (3) major urban cities in Selangor, Malaysia. Of those involved, 38.46% were in Shah Alam whereas 34.62% and 26.92% were in Subang Jaya and Petaling Jaya respectively. The results as described in Table 4 were based on the 52 samples for medium cost apartments which were more than four (4) years of building age. The majority of the apartments involved had ages which were ten (10) years and above, representing 53.85% of the total sample. Meanwhile, apartments with ages

between four (4) to six (6) years comprised about 9.62% and those with ages between six to nine years comprised about 36.54%.

Table 4. Respondent Demographics

Demographic characteristics	Frequency	Percentage	Total Percentage	n
Working Experience			100%	52
Less than 5 years' experience				
Chairman	8	15.38%		
Secretary	13	25.00%		
Treasurer	14	26.92%		
6 to 10 years' experience				
Chairman	2	3.85%		
Secretary	5	9.62%		
Treasurer	9	17.31%		
More than 10 years' experience				
Chairman	-	-		
Secretary	1	1.92%		
Treasurer	-			
Area of Survey			100%	52
Shah Alam	20	38.46%		
Subang Jaya	18	34.62%		
Petaling Jaya	14	26.92%		
Housing Age			100%	52
4 to 6 years	5	9.62%		
7 to 9 years	19	36.54%		
10 years and above	28	53.85%		

Table 5. Result of the study

	Factor	Mean	Std. Deviation	Average mean	Rank
Management Commitment & Support					
MCS1	Strategic management knowledge	3.69	1.274	3.629	4
MCS2	Operation management knowledge	3.62	1.085		
MCS3	Delegate duties	3.51	1.134		
MCS4	Systematic documents	3.80	1.034		
MCS5	House rules communicated clearly to residents	3.65	1.067		
MCS6	Incentives	3.35	.943		
MCS7	Collective ownership	3.78	.976		
Competence of Supervisor					
CS1	Maintenance experienced	3.69	1.158	3.613	5
CS2	Professional membership	3.40	1.087		
CS3	Ability to handle entire management's complexity/capable	3.75	1.076		
Residents' Expectation					
R1	Understand residents' needs	3.86	.933	3.826	1
R2	Good relationship with residents	3.68	.970		
R3	Effective communication	3.82	.967		
R4	Awareness on charges & fees	4.18	.748		
R5	Awareness on house rules	4.00	.729		
R6	Awareness on acts	3.72	.976		
R7	Awareness on building maintenance	3.52	1.147		
Learning & Growth					
LG1	Cultural changes	3.62	.979	3.608	6
LG2	Continuous improvement	3.62	1.056		
LG3	Training	3.62	1.085		
LG4	Lesson learnt	3.58	1.029		
LG5	Technology utilisation	3.60	1.058		
Financial Resources					

	Factor	Mean	Std. Deviation	Average mean	Rank
F1	Sufficient fund	3.75	1.061	3.760	3
F2	Charges comparable with facilities	3.77	.965		
Pre-condition during Developer's Transition Period					
DTP1	Design & layout	3.77	1.101	3.810	2
DTP2	Quality construction	3.86	.998		
DTP3	Handover documents	3.80	1.078		

The results including means for all the constructs are presented in Table . The overall mean for each factor was obtained to examine the critical success factors for managing apartments perceived by respondents. The highest mean value was observed for residents' expectations at 3.826 followed by pre-condition during the developer's transition period at 3.810 and financial resources at 3.760. On the other hand, Staff Competence and Learning and Growth are the two lowest mean values for CSFs, respectively at 3.613 and 3.608. The discussion about degree of perception of CSFs in managing quality FM in apartments are determined from these criteria obtained from the analysis.

RESULT AND DISCUSSION

Residents' Expectation

Residents' expectations are observed as the most crucial factor for quality management in managing apartments. This result is strongly supported by Guilding et al. (2014) who conducted research on the psychosocial need fulfilment of residents in Australia. Findings showed that the fulfilment of residents' expectations is the primary factor for resident satisfaction in Australia. Their findings are consistent with an earlier study by Berkoz et al. (2009) who state that security environment, appearance of housing environment, well-maintained facilities and good social contact with the community are the criteria of resident satisfaction. In a further study conducted by Cho & Lee (2011), social and physical contact with the community such as activation of community spaces, programs and ecological living may lead to higher satisfaction. They found that a correlation analysis interpreted that when residents are satisfied with community space, programs and participation in the community, overall residents satisfaction rises.

Pre-Condition During Developer Transition Period

Pre-conditions during the developer transition period is viewed by the official management body managing the apartment as the second most crucial factor that should be emphasized for quality management. These findings are supported by Sajan (2015) where resident dissatisfaction in Sydney is related to poor design, possible inconsistencies in certification, and inadequate building regulation. Surprisingly, although Sajan's work involves buildings with more than ten years of construction age, the issues of design still persist. Additionally, efforts at identifying operation and maintenance concerns during the design stage have an influence on achieving the sustainability of the building (Ahmed, 2012; Ganisen et al., 2015; Adewunmi et al., 2016; Fatayer et al., 2019); thus, ignoring it may result in high operation maintenance costs in the future (De Silva et al., 2012). Therefore, a lack of consideration of this perspective in the early stages of design could lead to building decay and, in turn, affect the sustainability of the neighbourhood.

Financial Resources

This study revealed that financial resources are ranked the third most crucial factor for quality FM management in apartment. The result of this study is supported by previous research, particularly Yoo & Park (2007) who studied the relationship between customer satisfaction and financial performance towards the service quality of service firms. The researchers found out that greater customer satisfaction was related to an increase in financial performance. In fact, financial performance is the indicator that the organization is either performing well or underperforming as per an initial study by Hinks & Mcnay (1999). A study by Ngai Ming et al. (2007) highlighted that in Hong Kong the issues between the residents and the management are significant as they reflect the mission of the management service (Ngai Ming et al., 2007). If disputes occur between the residents and the management, they tend to ignore the fee payment of the apartment. This, in turn, results in insufficient funds to manage and maintain the facilities in the apartment (Hussain, 1999), thus deteriorating the building's quality (Ganisen et al., 2015). In another study, low performance of the management body may leads to a lack of trust by the residents or owners and was seen as a possible trigger to prompt owners to switch managements (Levy & Sim, 2014).

Management & Commitment

Based on the observations made by respondents, this factor was ranked number four among critical factors for quality management in managing apartments. This factor also scored neutral to critical factors. This study was supported by Vergara et al. (2019) where trust of residents towards management bodies may improve the quality of management with commitment and support from the management body. An earlier study by Samson & Terziovski (1999) shows a significant relationship between total quality management practices and organizational performance. Hence, management commitment and support also influence the quality FM in apartments.

Staff Competence

Competence is the knowledge, motivation, skills, social characteristics, experience and role of an individual in accordance with the demands of an organization. Staff competence was ranked the second last critical factor for managing quality management in apartments. The research of Tan et al. (2014) supports this study as competent personnel could provide quality delivery service in terms of repair and maintenance service activities. Studies from Akinsola et al. (2012) focusing on adequate and skilful personnel found that those with such qualities may avoid job delays, hence giving a fast response to complaints received.

Learning & Growth

Learning and growth is ranked last among critical success factors for quality management in managing high-rise housing. Although it is ranked last among other factors, the mean value of the factor is still scored in the category of neutral towards critical. The findings of Yoo & Park (2007) in the hotel service industry which found that the training of the employees has an influence on the quality of service to the customer support this study. Procurement

Executives' Association (1998) stressed that in achieving quality management, employees need to be adequately skilled and be supplied with accurate and timely information to serve the residents; therefore, training should be encouraged by the committees. On the other hand, committees should encourage cultural changes and innovativeness to adapt changes for long term business survival (Hui, 2005).

To sum up, those six (6) factors of quality FM in apartments were rated neutral to critical. These results may perhaps be due to the lack of respondents' experience in managing the apartments as the majority of the respondents had less than five (5) years of experience. In addition, most of them were managed on a voluntary basis and not on a daily basis. On the other hand, the Strata Management Act 2013 (Act 757) highlighted that the management period of the chairman has a range to a maximum of three years and other committees have a range to a maximum of two years. This scenario is to avoid any misuse of power by the management body as stressed by Johnston & Too (2015).

CONCLUSION

CSFs in managing apartments aim primarily to provide residents with a pleasant and comfortable living environment. Examining and identifying the CSFs of managing quality FM in such buildings prevents risks of safety and health, thus improving the quality of the environment for residents and the public. Six (6) CSFs were identified from previous studies, and these are residents' expectations, staff competence, learning and growth, financial resources, management commitment and support, and pre-condition during the developer's transition period. This study revealed that resident expectation is identified as the most crucial factor compared to other factors which may help an organization improve the quality of their FM management. The validity and reliability of the items measuring the CSFs for managing such development was above 0.900; thus, the instruments were considered to be reliable.

The research will be of interest to those involved with managing FM in apartments. The study reveals a few CSFs that the official management body should be mindful of when deciding what crucial factors to be focused on for quality FM in a development. Careful consideration of the factors as well as continuous improvement and adaptation to business changes may result in not only a more cost-effective but also more efficient management. The authors' contributions to knowledge include the potential constructs that could be developed as key performance indicators (KPIs) for efficient facilities management (FM) in apartments, specifically in the local region. For future research, the researchers will look at the relationship between CSFs and the performance of the organization. Another future studies will see a survey being conducted according to the type of management, e.g., Joint Management Body, Management Corporation or Managing Agent, in the Malaysian context.

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THE DETERMINANTS OF PUBLIC RENTAL HOUSING CHOICES AT ISKANDAR PUTERI, MALAYSIA

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Abstract
The basic needs for human being are shelter or a house. Housing influence and shape human productivity and development. The United Nation defined housing as residential environment, neighbourhood, micro-district, or the physical structure that human uses for shelter, thus including all necessary services, facilities, equipment and devices needed for the physical and mental health and social well-being of the family and individual. It is therefore a human's right to own a house, this is not only associated with social inclusion but also viewed as a personal success. Malaysian government had embarked upon several efforts to provide quality and affordable public housing for every citizen. The quality residential environment of rental public housing are the factors that determine the level of residents' satisfaction. This study attempts to identify the components of public housing residents' satisfaction and thus ranked those determinants. The instrument used to collect data from targeted respondents is questionnaire survey. The targeted respondents are the residents of Rumah Iskandar Malaysia, located at Gelang Patah, Nusajaya. Descriptive analysis and cross-tabulation analysis were performed to analyse the collected data. The analysis reveals there are five determinants found as important to resident's choice of public housing which are dwelling unit features, dwelling unit support service, public facilities, social environment and neighbourhood facilities. This study provides a thorough understanding and knowledge on level of rental public housing residents' satisfaction with the residential environment.

Keywords: *Public rental housing; housing determinants; tenant's satisfaction; Rumah Iskandar Malaysia.*

INTRODUCTION

The Eleventh Malaysian Plan highlighted the commitment of the government to change the low and medium cost houses by providing adequate, affordable, and quality public homes. Rental Public Housing Programs is one of the government initiatives to overcome the affordable housing issues. Rental public housing provided at nominal rent to the needy and are publicly funded and administered for low-income families. As reported by National Housing Department in 2018, there are 56,020 units of rental public housing throughout Malaysia.

The mismatch between household's income with the increasing price of properties especially in bigger cities lead to the issues of home ownership. Due to the property prices at bigger cities are sky-high, therefore low- and middle-income household are compelled to rented homes that are rather cheaper. Renting is essentially an urban tenure due to a massive wave of people moved to the cities. As a result of the issues of housing loan, most of the middle-income households are not afforded to own a house. Baqutaya et al. (2016) relates the issues of housing loan with extreme housing price, high interest rate, low-income increment, and price inflation of living goods. This situation forces the middle-income group to find another alternative to home ownership which is renting. Shuid (2015), indicates that the development of public housing in urban area are facing problems such as housing maintenance, management, and anti-social behaviour. Whereas Croucher et al. (2008) stated

that poor housing condition in term of overcrowding, poor insulation and air quality problems will lead to poor physical health as well as stress and mental health problem. It is therefore importance to incorporate the aspect of quality residential environment towards the affordable housing residents.

Malaysia's Vision 2020 empathized on providing adequate essential shelters and accessing to health facilities as well as basic amenities, that are the basis for improving the quality of life (Tan, 2011). Public housing is not simply about house price, besides the government also need to be focussing in providing quality amenities and facilities, therefore a wider range of social economic households will choose to relocate there (Eshruq Labin et al., 2014). Therefore, it is important for the government and related parties to incorporate the elements of wants and needs of the targeted groups for affordable houses. This is by understanding the satisfaction level of public rental housing residents in the existing projects. Based on the resident's feedback and opinion, the government can make improvement in quality of public rental housing supplied. The aim of this study is to provide an overview of the determinants for public rental housing choices in Iskandar Malaysia. The main finding will show the highest determinants for public rental housing choices.

LITERATURE REVIEW

Public Rental Housing

Public or affordable rental housing is a rental public housing provided by either public or private agencies with the government-controlled rents (Gan et al., 2016). In China, to cope with the migration of workers from rural areas to cities the government had introduced public rental housing since 2009 (Huang, 2012). The public rental housing focuses on low-income households with housing difficulties, new employees and qualified migrant with stable income and residences in the cities.

In addition, Isa et al. (2012) defined public rental housing is housing that was built and owned by the government, thus it is typically provided at nominal rent to the needy or publicly funded and administered for low and medium income families, elderly and people with disabilities.

A housing occupancy report in Malaysia revealed a remarkable percentages of housing provision were not occupied by the targeted user (Isa et al., 2012). Study conducted by Isa et al. (2012) suggested that non-occupancy will be minimised because of end-users perceived attitudes towards housing acceptance and satisfaction. Hence, the introduction of end-users' participation approach in Malaysia housing delivery system will prompt adequate housing occupancy.

The quality of housing closely related to the quality of life. The development of low and medium houses nowadays only focusing on the quantity supplied to ensure every households are able to occupy a house. Hence, the supply of affordable houses is lack in the quality aspect of housing. According to Zairuslan et al. (2012), the aspect of physical building and environmental of housing are not included in the development of affordable houses in Malaysia. Whereas Mohit et al. (2010) stated that there are two main problems occurred in the development of affordable housing. He highlighted the problem in the unit supplied as not

meeting the demand and secondly the type of affordable housing has not been satisfactory to the resident needs, comfort, social, cultural and religious needs. These issues will influence the quality of life and thus affects the psychosocial aspects of the inhabitants.

Rental public housing is developed to provide safe and affordable places for low-income households, the elderly and people with disabilities to reside (Hryshko, 2010). Meanwhile, Lubell et al. (2007) suggest the stability of affordable housing or rental housing can gives implication on childhood development. In addition, James et al. (2008) supports with the negative implication of inappropriate quality of affordable housing are the residents moving away, poor neighbourhood and community development and under-achievement in the children's education. It is essential to develop a quality affordable housing for the targeted groups. Housing satisfaction, according to Isa et al. (2012) encompasses the quality of building, thus includes safety features, adequate facilities, amenities, and design. Colesia and Alpopi (2011) added the performance of housing, the quality and facilities may affect the residents' quality of life and encourage satisfaction.

There are increasing interest towards the study on how people think of their housing and how it affects their lives. In both UK and US, the local governments conduct regular tenant satisfaction survey to ensure that households are satisfied with the provided housing and services (Varady & Carrozza, 2000). Resident's satisfaction are important indicators to the planners, architects, developers, and policymakers to supply houses according to the needs and wants. It is believed that housing allocation institutions determining housing access type and housing adjustment freedom have an influence on residential satisfaction levels (Chen et al., 2013).

Whereas a study by Lubell et al. (2007) suggested that the stability of public rental housing might have effects on childhood development. Besides, Byun et al. (2016) study on the determining the level of satisfaction among residents in public rental housing in South Korea. The study aimed to solve the housing problems of low-income households. The findings revealed the environmental factors impacting individual living in public rental housing were safety and incivility factor, physical factor, facilities accessibility factor and equipment factor. They recommended the government should have a plan that consider priority improvement on the residential environment, thus to improve the resident satisfaction.

Residents' Satisfaction in the Context of Public Rental Housing

According to Jiboye (2009), housing satisfaction are beyond the physical and structural adequacy. Hence, it encompasses all the infrastructures, utilities, and services necessary to complement human survival including access to employment and security. Housing had been shown to be one of the best indicators of person's standard of living and place in the society. Household's satisfaction with the overall residential environment indicates the quality of life as it complies with their needs and aspirations (Waziri et al., 2013). Amole (2009) stated residential satisfaction is a concept that can be influenced by both objective and subjective measure of housing attributes that includes physical, social/psychological and management attributes and the demographic characteristics of the residents.

The concept of housing satisfaction relates to how a consumer of housing product reacts to the overall components of such a product as predicted by their taste as a ratio to his

expectations. It is also referring to individual's evaluation of their housing environment, thus subjected to their needs, expectation and achievement (Hui and Yu, 2009). Hence, the concept of residential satisfaction was developed based on the gap between actual desired housing by occupants and the determinant of actual neighbourhood conditions. The concept of residents' satisfaction is generally linked with the quality of life as indicated by most researchers. (Park, 1996; Lee and Park, 2010; Caldeieron, 2011; Ibem and Amole, 2012).

Furthermore, Salleh et al. (2011) stated that the concept of housing satisfaction has been used for four major objectives. The first objective is as the key to predict an individual's perception on the overall quality of life. Thus, the second objective is as an indicator of individual mobility that are able to change the demand of housing and influences the surrounding changes. Housing satisfaction also can be used as ad hoc measurement of private sector development success. Lastly, housing satisfaction as an evaluation tool to measure residents' acceptance of prevailing shortcomings for existing surrounding area development.

The Determinants of Public Rental Housing Choices

Ibem and Arnole (2012) and Ibem and Aduwo (2013) stated that resident's satisfaction can be measured by people's perception of the actual residential environment to meet expectations. Based on the finding from Huang, Z. & Du, X., (2015) study, they developed a conceptual framework of residents' satisfaction that includes housing characteristic, neighbourhood characteristic, public facilities, and social environment. Meanwhile the study conducted by Mohit et al. (2010) indicates the residential satisfaction are affected by these variables; dwelling unit features, dwelling unit support services, public facilities, social environment, and neighbourhood facilities. Figure 1 shows the determinants of public rental housing choices adapted from M.A. Mohit et al. (2010).

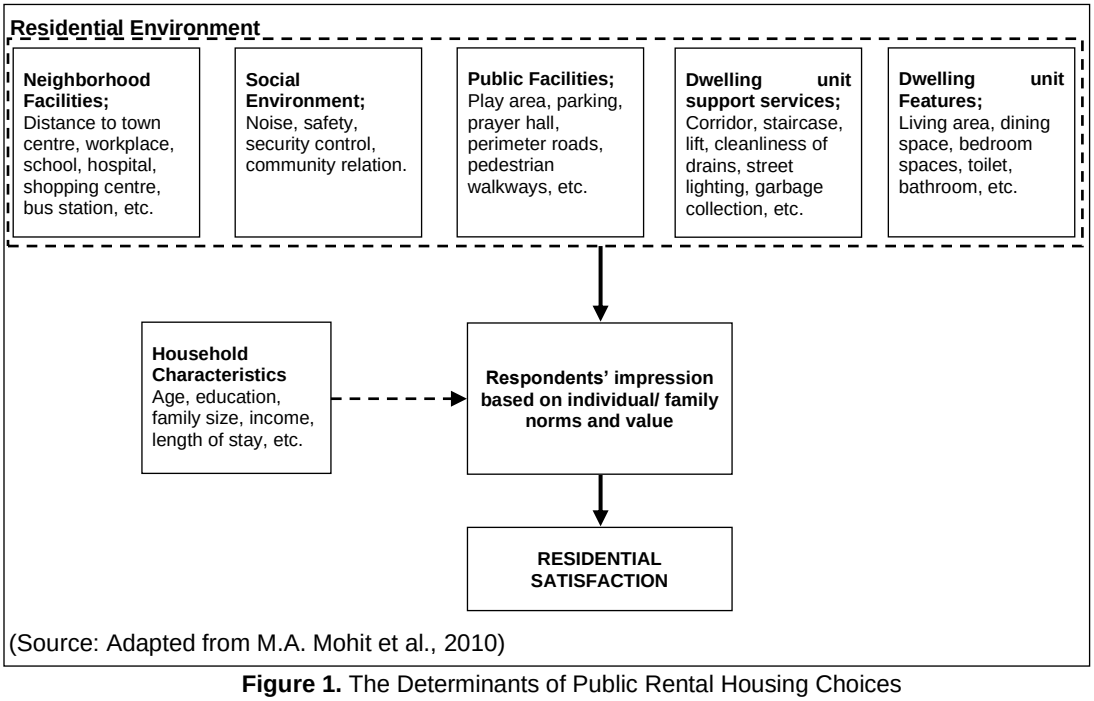

Figure 1. The Determinants of Public Rental Housing Choices

Housing characteristic or dwelling unit features refers to the physical features of the building. The dwelling units features as stated by Mohit (2010) refer to the floor plan of internal spaces within the dwelling unit and includes the living, dining, bedroom, kitchen, bathroom, toilet and drying area, thus including ventilation of the house. Bujang et al. (2010) added quality housing feature include physical and non-physical characteristic. Physical characteristics comprised location, housing design, type of housing and the resident's level of comfort. Building features such as number of bedrooms, size and location of kitchen and quality of housing units are strongly related to residential comforts (Ghani, 2008). Furthermore, Rahadi et al. (2015) highlighted that the housing preferences includes location accessibility, physical qualities, the design concept, marketing concept and location uniqueness. They found that there is strong connection between preferences that are being proposed by the developers and the residential consumer preferences.

The dwelling unit support services are the external space or support space outside the dwelling unit however still located within the housing block. The variables include corridors, staircase, balconies, electricity supply, water supply, sewerage, drainage, telecommunication, lifts, and firefighting system. Kuala Lumpur City Hall according to Bujang et al. (2010) has allocated certain amount of fund to develop quality public housing and comfort programme. Among the quality and comfort enhancement programme were carried out are lift replacing, renovation unit of 1 and 2 bedroom to 3 bedrooms, building painting, tiles installation in lobby lift area, spiral waste bin equipment, grill installation and much more.

Neighbourhood facilities or public facilities are a determinant factor of residential satisfaction with its associated physical and social characteristics. Public facilities or infrastructure such as transportation, school, healthcare centre, shopping, banking and parking facilities determine the degree of life convenience. Hence all these features have influences on residential satisfaction (Hwang et al., 2015). A study by Lu (1999) found out the residents in public housing in Hong Kong are dissatisfied with public transportation. Whilst Ha (2008) found that residents of public housing in Korea are satisfied with the availability of healthcare, shopping and banking facilities, however they are dissatisfied with parking and landscaping facilities. A study conducted by Mohit and Azim (2012) showed that residents of public housing in Hulhumale, Maldives are more satisfied with their public facilities compared to their housing condition.

Residential satisfaction is influenced by social environment, such as social relations and community cohesion and security. Hence, Ariaanse (2007) found among the factors that influence the resident's satisfaction are social climate and social perception of social relationship. Ibem and Aduwo (2013) also found that the residential satisfaction is contributed by people's cohesion and participation in the development of residences.

Mohit and Azim (2012) showed that residents of public housing in Hulhumale are satisfied with their social environment, especially with the elements of security and their relationships with their neighbours and community. Their study reveals that most of the respondents were very satisfied with the level of security (77%) and were satisfied with the level of crime within the housing area (51%). Whereas the study ranking on social environment by mean satisfaction level indicates the residents are most satisfied with the relationship with their neighbours and with community. In addition, Byun and Ha (2016) study found that safety and incivility factor have a significant effect on the residential

satisfaction of public rental housing residents. They indicated that social interests and demand for safety have been recently increasing in public housing in Seoul.

STUDY AREA, DATA AND METHODS

Study Area

The study is based on data collected in public rental housing (PRH) at Iskandar Puteri, Malaysia. The research was conducted in Iskandar Puteri due to Johor had recorded the highest number of public housing build as compared to Selangor. The PRH comprises of 1,500 units apartment in the form of low-rise three (3) and four (4) story walk-up apartments. This public rental apartment has medium density housing of 25 units per acre with 2 plots, thus Plot A comprises of 21 apartment blocks and Plot B comprises of 13 apartment blocks. Rental range per month is between RM510 to RM740 per month. It is managed and maintained by Prisma Harta Sdn. Bhd., a subsidiary company of Iskandar Regional Development Authority (IRDA). The summary of Iskandar Malaysia (IM) public rental housing is shown in Table 1.

Table 1. Iskandar Malaysia Public Rental Housing Key Fact

Project Name	**Rumah Iskandar Malaysia (completed in April 2012)**
Project Cost	RM 200 million
Location	Gelang Patah Road, Nusajaya, Johor.
Site	PTD 124161 and PTD 171812, Mukim Pulai, Johor.
Land Size	60 acres
Density	25 units per acre
Blocks	Plot A – 21 blocks Plot B – 13 blocks
Type of Housing	3 bedroom and 4 bedroom-apartments within 3 and 4 storey walk-up apartment
Built Up	900 sq. ft. and 1,200 sq. ft.
Total Unit	1,500 units
Composition	3-bedroom apartment: 1,340 units (Includes Disabled Apartment unit – 32 units) 4-bedroom: 160 units

(Source: Prisma Harta Sdn. Bhd.)

Data Collection and methods

This study using quantitative approach, it focuses on numbers and unchanging data and details, convergent reasoning rather than divergent reasoning. Using this approach, the researcher has clearly defined research questions that will be answered through research objectives. This approach involved developing questions for surveys, learning to quantify responses, statistically analysing archival, history or own data. A common form in quantitative approach is questionnaire. For this study, the researcher uses quantitative approach to achieve the research objectives. A set of questionnaires will be used as an instrument for collecting data from the targeted respondents. The questionnaires were distributed to 210 residents of IM public rental housing. The questionnaire is divided into six main section. Section A is designed to obtain demographic information from respondents. Whereas section B, C, D, E and F the type of question used are likert scale.

The index scale is applied to analyse the group of data in determining the most typical value. The mean derived from the analysis were divided into several classes. Thus, this is for

the purpose of having these classifications to perform a basic for calculating the significant of each satisfaction level. The satisfaction index was derived from the formula:

$$\text{Range} = \frac{\text{Max mean Score - Min Mean Score}}{\text{Classes}}$$

$$\text{Index} = \text{Range + Mean Score}$$

Figure 2. Satisfaction Index Formula

Size of class interval refers to the range, which is the different between the highest value and lowest value of the mean divided by the number of classes that is needed.

RESULT AND DISCUSSION

Demographic profile of the Households

The population of Rumah Iskandar Malaysia are 4,064 residents, thus by using Taro Yamane (1976) sampling table, the targeted respondents are 364 residents. In total, there are 210 completed survey forms were returned and analysed and the results are present in Table 2, and 3 and Figure 3. In total 54 per cent of the respondents were males, and 52 per cent were in the age of 25 to 30 years old. Some 46 per cent of the respondents obtained collage/ institution/ university education. Some 31 per cent have upper secondary school education. A total of 34 per cent of surveyed respondents earned between RM2,501 to RM3,500 (Table 3).

Table 2. Distribution of educational qualification

Qualification	No formal education	Primary school	Lower secondary school	Upper secondary school	College/institute/ university	Total
Frequency	2	5	41	65	97	210
(%)	1	2.4	19.5	31	46.2	100

Table 3. Distribution of family income (RM)

Income	900-1,500	1,501-2,500	2,501-3,500	>3,501	Total
Frequency	20	50	71	69	210
(%)	9.5	23.8	33.8	32.9	100

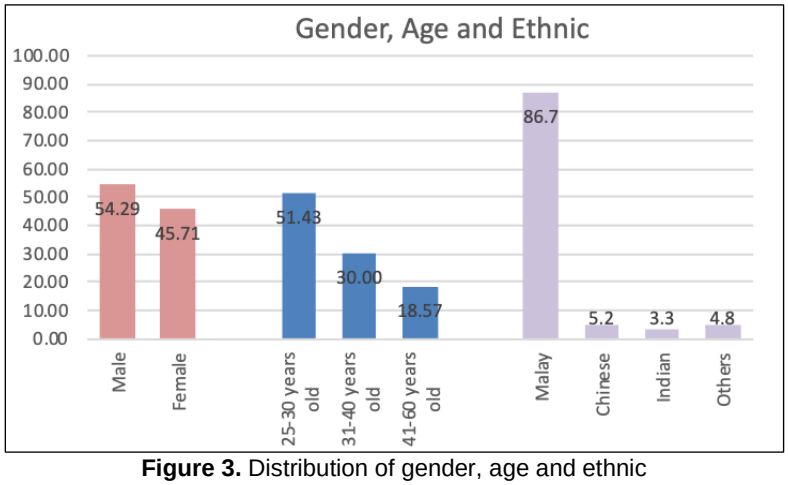

Figure 3. Distribution of gender, age and ethnic

Determinants of Public Rental Housing Choices

The level of satisfaction of RIM occupants is separated into 5 components which are dwelling unit features, dwelling unit support services, public facilities, social environment and neighbourhood facilities. Satisfaction index were employed to rank the determinants for public rental housing choices as shown in Table 4 and 5. Among five determinants of public rental housing choices, the number of bedrooms, garbage collection services and cleanliness of corridor, the availability of prayer hall and road perimeter, security, close proximity to religious building and workplace were ranked as extremely satisfied by the occupants. Whereas, the occupants also ranked cleanliness of the public rental housing, interaction with the community, and proximity to the nearest town as most satisfied. The other determinants ranked as satisfied by the occupants were the size of master bedroom, staircase, the multi-purpose hall and playground, and proximity to the nearest shopping mall (Table 4).

Table 4. Public Rental Housing Determinants for higher Satisfaction Index

Determinants	Mean	Sum	Satisfaction Index
Dwelling Unit Features			
Bedroom 4	5.79	1216	Extremely Satisfied
Bedroom 1	4.00	839	Satisfied
Dwelling Unit Support Services			
Garbage Collection	3.45	725	Extremely Satisfied
Corridor	3.44	722	
Cleanliness	3.41	717	Most Satisfied
Staircase	3.38	709	Satisfied
Public Facilities			
Prayer Hall	3.97	834	Extremely Satisfied
Road Perimeter	3.64	764	
Multi-Purpose Hall	3.57	750	Satisfied
Playground	3.55	746	
Social Environment			
Security	3.51	738	Extremely Satisfied
Community	3.48	730	Most Satisfied
Neighbourhood Facilities			
Religious Building	3.65	766	Extremely Satisfied
Workplace	3.55	746	
Town	3.46	727	Most Satisfied
Shopping	3.37	707	Satisfied

Table 5 indicates the lowest ranked determinants of public rental housing. The size of bedroom 2 and bedroom 3 and bathroom, walkaway and number of available parking, the long distance of police station and bus station from the public rental housing were ranked as less satisfied by the occupants. Besides, the size of living area, dining area and kitchen, ventilation of the apartment unit and laundry area, cleanliness of drain and lighting, the availability of food stall and local shop, crime and noise, long distant to the nearest fire station and hospital were ranked as least satisfied by the occupants. The overall result of satisfaction index is attached at the Appendix 1.

Table 5. The lowest ranked determinants of public rental housing

Determinants	Mean	Sum	Satisfaction Index
Dwelling Unit Features			
Bedroom2	3.90	819	Less Satisfied
Bedroom3	3.92	824	
Bathroom	3.80	797	
Size of Living Area	3.70	777	Least Satisfied
Size of Dining Area	3.70	777	
Size of Kitchen	3.58	752	
Ventilation	3.40	714	
Laundry-Area	3.18	667	
Dwelling Unit Support Services			
Drain	3.34	702	Least Satisfied
Lighting	3.28	688	
Public Facilities			
Walkaway	3.51	738	Less Satisfied
Parking	3.44	723	
Food Stall	3.22	676	Least Satisfied
Local Shops	3.21	674	
Social Environment			
Crime	3.37	707	Least Dissatisfied
Noise	3.36	705	
Neighbourhood Facilities			
Police Station	3.26	684	Less Satisfied
Bus Station	3.24	680	
Market	3.23	678	
School	3.22	676	
Fire Station	3.12	655	Least Dissatisfied

CONCLUSION

The size of bedroom 2 and bedroom 3 and bathroom, walkaway and number of available parking, the long distance of police station and bus station from the public rental housing were ranked as less satisfied by the occupants. Besides, the size of living area, dining area and kitchen, ventilation of the apartment unit and laundry area, cleanliness of drain and lighting, the availability of food stall and local shop, crime and noise, long distant to the nearest fire station and hospital were ranked as least satisfied by the occupants. The overall result of satisfaction index is attached at the Appendix 1.

This research provides an alternative lens to view households' determinants for public rental housing choices. The study combined both internal and external factors that governs household decision making. There are many criteria influence the household choices. As supported by literature, household priorities that are non-financial determinants are security and physical dwelling features and dwelling support services. This information will guide the stakeholders, especially the policy makers to produce a guideline that fulfill with the needs of the households. Thus, this is to ensure that the public rental housing supply by the government meets the household needs.

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APPENDIX 1

Determinants	Ranking	Mean	Sum	Satisfaction Index
Dwelling Unit Features				
Bedroom4	1	5.79	1216	Extremely Satisfied
Bedroom1	2	4.00	839	Satisfied
Bedroom2	3	3.90	819	Less Satisfied
Bedroom3	4	3.92	824	
Bathroom	5	3.80	797	
Size of Living Area	6	3.70	777	Least Satisfied
Size of Dining Area	7	3.70	777	
Size of Kitchen	8	3.58	752	
Ventilation	9	3.40	714	
Drying-Area	10	3.18	667	
Dwelling Unit Support Services				
Garbage Collection	1	3.45	725	Extremely Satisfied
Corridor	2	3.44	722	
Cleanliness	3	3.41	717	Most Satisfied
Staircase	4	3.38	709	Satisfied
Drain	5	3.34	702	Least Satisfied
Lighting	6	3.28	688	
Public Facilities				
Prayer Hall	1	3.97	834	Extremely Satisfied
Road Perimeter	2	3.64	764	
Multi-Purpose Hall	3	3.57	750	Satisfied
Playground	4	3.55	746	
Walkaway	5	3.51	738	Less Satisfied
Parking	6	3.44	723	
Food Stall	7	3.22	676	Least Satisfied
Local Shops	8	3.21	674	
Social Environment				
Security	1	3.51	738	Extremely Satisfied
Community	2	3.48	730	Most Satisfied
Crime	3	3.37	707	Least Dissatisfied
Noise	4	3.36	705	
Neighbourhood Facilities				
Religious Building	1	3.65	766	Extremely Satisfied
Workplace	2	3.55	746	
Town	3	3.46	727	Most Satisfied
Shopping	4	3.37	707	Satisfied
Police Station	5	3.26	684	Less Satisfied
Bus Station	6	3.24	680	
Market	7	3.23	678	
School	8	3.22	676	
Fire Station	9	3.12	655	Least Dissatisfied
Hospital	10	3.02	635	

DEFINING THE CONCEPTUAL COMPETENCIES FRAMEWORK FOR PHYSICAL FACILITIES MANAGEMENT OF HIGHER EDUCATION INSTITUTION

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Abstract
Managing the physical facilities of higher education is complex and challenging due to the users' different requirements among programs, departments, and faculties. Thus, the role of the facilities management team is essential to ensure it meets the institution's business objectives. A competent facilities manager and team are vital, which can support the facilities management practice for higher education institution in line with its vision and mission. This paper aims to identify the relevant facilities management competencies based on professional practice with the objective to suggest the most suitable competencies criteria for managing the physical facilities of the higher education institution. A content analysis was engaged to six (6) professional bodies established competencies and literature review. The research revealed that a total of 22 competencies are designed to manage physical facilities for the organisation. Moreover, the highest ranked criteria were the business support services management and adopted by all professional institutions, followed by sustainability, finance and IT criteria. As for managing the uniqueness of physical assets in a higher education institution, the additional competencies required are the current government policies and strategic management, technology technology-related tools, business strategy and asset strategy, and multitasking skills. Indeed, these competencies may help the higher education institution in managing their physical facilities more effectively.

Keywords: *Conceptual competencies framework; physical facilities; higher educational institution.*

INTRODUCTION

Facilities Management (FM) is a multi-discipline profession that supports the strategic objectives of an organisation. It involves several non-core specialists' services such as development, coordination, and management besides buildings and their systems, plant, IT equipment, fittings and furnishings (Kamaruzzaman and Zawawi, 2010). FM integrates performance assessment issues concerning the overlapping of people, processes, and places in organisations at its existence as a modern discipline (Amaratunga and Baldry, 2000). The vision of the organisation could be shifted from short term to long term through the credibility of the facilities management group. This includes long term savings made from the bottom-line productivity improvements and efficient operation and maintenance (Hodges, 2005); hence the importance of FM in an organisation is unquestionable.

Physical facilities of higher educational institutions are unique in a way that it must cater to the multi-layer of stakeholders, from the users, the staff, the visitors, the community, the policymakers, etc. Hence, this makes the facilities planning and managing complex and multi-generations. Planning, designing, constructing, and managing this type of physical assets would require core knowledge, techniques, technical skills, and interpersonal skills the nature of the educational institution also tied with the government policies and strategic direction of the institution. Therefore, the role of a Facilities Manager is significant as manager's competency is related with the maintenance performance (Au-Yong et al., 2017).

Besides, the pedagogy of teaching and learning has evolved systematically and holistically. Today there are many approaches such as smart classrooms, teaching without walls, smart technology, virtual education, etc. This is a challenge to the FM team in providing the learning environment according to the needs. The purpose of the paper therefore is to determine the competencies required in managing the physical facilities of higher education institutions, particularly facilities managers. In this paper, the term 'facilities manager' refers to those involved in the managerial FM work regardless of their position, such as assistant facilities manager, head of department, or operation executive.

BACKGROUND OF STUDY

Facilities management and Competencies Framework

Facilities management competencies have been established and practised by the different body of knowledge and institutions, namely the International Facility Management Association (IFMA) and Institute of Workplace and Facilities Management (IWFM) as the pioneer in the industry, followed by various other institutions. Competency is defined as a person-related concept that refers to the dimension of behaviour behind the competent performer. It is a work-related concept that relates to the areas of work at which the person is qualified (Baharum et al., 2016), and it combines the implicit and explicit knowledge, behaviour and skills, that contribute to individual potential effectiveness in performing a task (Draganidis and Mentzas, 2006).

Baharum et al. (2016) identified five types of competencies. They are:

1. Foundation competencies: common behaviours, skills, and knowledge in the organisation such as communication
2. Focus competencies: those related to a particular industry or profession such as legislation or best practice guidelines
3. Execution competencies: those required to carry out a specific part such as customer service agent or customer service manager
4. Potential competencies: those the organisation would like to see an individual development for the organisation's benefit.
5. Aspiration competencies: those that an individual hope to develop over a longer period and need not be connected to an organisational need either current or in the future.

Although the FM industry has started since 1960, little attention has been given to the required competencies to maximise the benefits they deserve. In the United Kingdom, only in the 1990’s the interest in competency framework application was increased for the development of expert managers and general managers (Awang et al., 2012; Roberts, 2001). This followed the adoption of competency framework by professional bodies such as IFMA and IWFA in professional accreditation in the field of FM, which mainly shares the same competence area such as human resources, communication competence, and communication of information within the same domain (Clark and Lynda, 1999). There is no explicit agreement that FM has a strategic role to play during the development. Still, there does appear to be a groundswell towards developing a more strategic orientation for the discipline. Furthermore, the facilities manager's aim was known only to integrate the work of the specialists involved. The truth is FM does not require technical knowledge, but to have in-

depth expertise in coordination, control, and planning at a strategic level (Waheed and Fernie, 2009).

The FM profession has evolved to a point where there is higher demand, worth USD 394 billion in 2017, and expected to reach USD 892 billion in the next 25 years. This is the driving force behind the growth of the body of knowledge and institutions in FM to ensure that the profession stay relevant and deliver quality services (Dey, 2015).

The institutions that are active in providing and establishing competencies of FM include:

Table 1. List of professional bodies that provide FM competencies

Name of Institution	Leadership in Educational Facilities (Formerly known as Association of Physical Plant Administrators	Royal Institution of Chartered Surveyors	International Facility Management Association	International Workplace Facilities Management (Formerly known as British Institute of Facilities Management)	Construction Industry Development Board	Hong Kong Institute of Facility Management
Abbreviation	APPA	RICS	IFMA	IWFM	CIDB	HKIFM
Country of origin	USA	UK	USA	UK	Malaysia	Hong Kong
Year established	1814	1868	1980	1993	1994	2000
Number of Competencies	4	18	11	10	9	11

Physical Facilities of the Higher Educational Institution

The World Declaration on Higher Education adopted by the World Conference on Higher Education in 1998, defined higher education as "all types of studies, training or training for research at the post-secondary level, provided by universities or other educational establishments that are approved as institutions of higher education by the competent state authorities." (Institute for International Cooperation/ Japan International Cooperation Agency, 2004, p.1). It includes universities and graduate schools and shorter-term education and training courses such as polytechnics, junior colleges, and numerous forms of technical-based schools that are 2-3 years duration, and even correspondence courses and are targeted at a wide-ranging population of students.

Higher education institutions play a significant role in the nation in contributing to the workforce, research, and development. The educational markets are operating differently compared to a decade ago. Their overall success and failures depend on how well they make a transition from local to regional and to international players without compromising their educational objectives and their roles developing and spreading knowledge and wisdom (Wood et al., 2005). Therefore, Walton and Galea (2005) suggested that higher education institutions should also focus on their non-core activities in such a way business would do for profit, such as managing facilities, procurement, and waste.

Almost every developed countries have international higher education initiatives, especially the large English-speaking nations and the larger EU countries. Among the

initiatives are flows of international students, franchisers of academic programs to foreign providers, international accreditors or quality guarantors, or controlling partners in twinning arrangements. These countries secure primary financial profits and manage most programs (Altbach, 2016). Since higher education has been treated as business-oriented that makes the industry's profit, it is vital for the facilities that support the learning environment to portray essential standards. As stated by Suttle (2007), facilities play a significant part in attracting and holding the best students, staff, and faculty. One-third of students attend a school because of amenities and technology features in Higher Education. The learning ambiance should be composed of physical and virtual environments, as well as social context, that facilitate interaction and individual privacy in the process of learning (Gersberg and Nenonen, 2007).

According to Musa and Baharum (2012), the types of physical facilities in higher institutions include provision of buildings, classrooms, hostels, staff quarters, workshops, laboratories, ICT centres, libraries, health centres, and sports facilities. These facilities have the characteristics to attract the users and enhance its required utilisation goals (Musa and Baharum, 2012).

Gersberg and Nenonen (2007) described the various characteristic of physical places needed for different purposes such as learning, discussion, and group work; group workspaces should suit different capacities, from auditoriums to small corners. The cafeteria should be flexible, not just for all-day café but also could be used for group discussion. The library should be located in the middle of the campus and equipped with many terminals, multimedia workstations, and connections to international information networks. Educators' workspaces should be within or close to the learning spaces, not isolated in a separate administration section.

The role of physical assets and the services related shall be a core competence itself rather than traditionally used for core competence effectiveness (Waheed and Fernie, 2009). Studies show that lack of facilities maintenance is one of the main reasons potential students decide not to attend a specific school. Higher education institution can create a conducive environment that promotes teaching and learning activities. Maintenance needs to be managed professionally to improve the service delivery outcomes and increase occupants' satisfaction (Lateef et al., 2010).

RESEARCH METHODOLOGY

The methodology used in this study is content analysis of literature review from scholars as well as the competencies established by all the six institutions in Table 1. It is aimed to explore the FM competencies from the body of knowledge of facilities management globally and locally. The competencies are compared in terms of frequency to obtain the most common competency among all the established institutions. They were then compared with the literature review on constraints in managing higher education institutions to find the added competencies required. Lastly, a competency criterion is developed based on relevant recognised competency models: The Iceberg, federal facilities assets, and OECD. These proposed competencies criteria are the proposed essential competencies for Facilities Manager's profession in managing physical facilities of higher educational institutions.

DISCUSSION AND FINDINGS

Analysis of competencies from FM Institutions

Findings from the established competencies by the professional institution mentioned in Table 1 were grouped under the same themes and re-arranged into 22 competencies, as shown in Table 2.

Table 2. Competencies matrix from various FM Institutions

	IWFM (2014)	IFMA (2013)	RICS (2018)	HKIFM (2011)	APPA (2018)	CIDB (2018)	Frequency
1	The role of facilities management	Real estate & property management	Asset management	Space planning & design management			4
2	Strategy & policy development		Business planning				2
3	Leadership & management	Leadership & strategy	Business alignment			Leadership & strategy planning	4
4	Business continuity & compliance	Emergency planning & business continuity	Health & safety	Health, safety & physical management			4
5			Legal/ regulatory compliance				1
6	Business support services management	Operations & maintenance	Maintenance management	Maintenance & operation management	Operation & maintenance	Operation & maintenance management	6
7			Workplace strategy				1
8	Property portfolio management			Real estate portfolio management			2
9	Quality management & customer service	Quality	Client care			Quality control management	4
10	Finance & IT	Finance & business	Accounting principles & procedures	Financial management		Finance & business planning	5
11		Technology	Data management	IT management		Technology management planning	4
12	Procurement & contract management		Procurement & tendering	Project contract management		Contract management governance	4
13	Sustainability	Environmental stewardship & sustainability	Sustainability	Environment management	Energy, utilities & environment stewardship		5
14			Inclusive environment				1
15		Project management	Project finance		Planning, design & construction	Project management planning	4

	IWFM (2014)	IFMA (2013)	RICS (2018)	HKIFM (2011)	APPA (2018)	CIDB (2018)	Frequency
16		Human factors	Supplier management	Human Resource management		Human resource planning	4
17			Diversity, inclusion & teamworking				1
18		Communication	Communication & negotiation			Communicatio n planning	3
19				Logistic management			1
20					General Administration & management		
21			Ethics, rules of conduct & professionalism				1
22				Law on local real estate			1
	10	11	18	11	4	9	

Each of the institutions has designed its competencies according to the needs of the profession and the industry. Some have very comprehensive and details coverage of competencies, while others are more general and basic. Table 2 above reveals that RICS has 18 items (mandatory and core), IFMA, and HKIFM each have 11 items of competencies, IWFM with 10, CIDB 9 and APPA 4 items.

Interestingly, there is only 1 item agreed by all the six institutions, which is business support service management/maintenance management. This signifies that it is essential to have this competency in managing any physical facilities. Sustainability/energy/ environmental and financial management, are the competencies agreed by five out of six institutions. The next most common competencies that are approved by four institutions are asset management, leadership, health and safety, quality management, IT management, procurement and contract management, project management, and finally, human resource management. The other competencies are significant exclusively for one or two institutions only. The data are illustrated in the following Figure 1.

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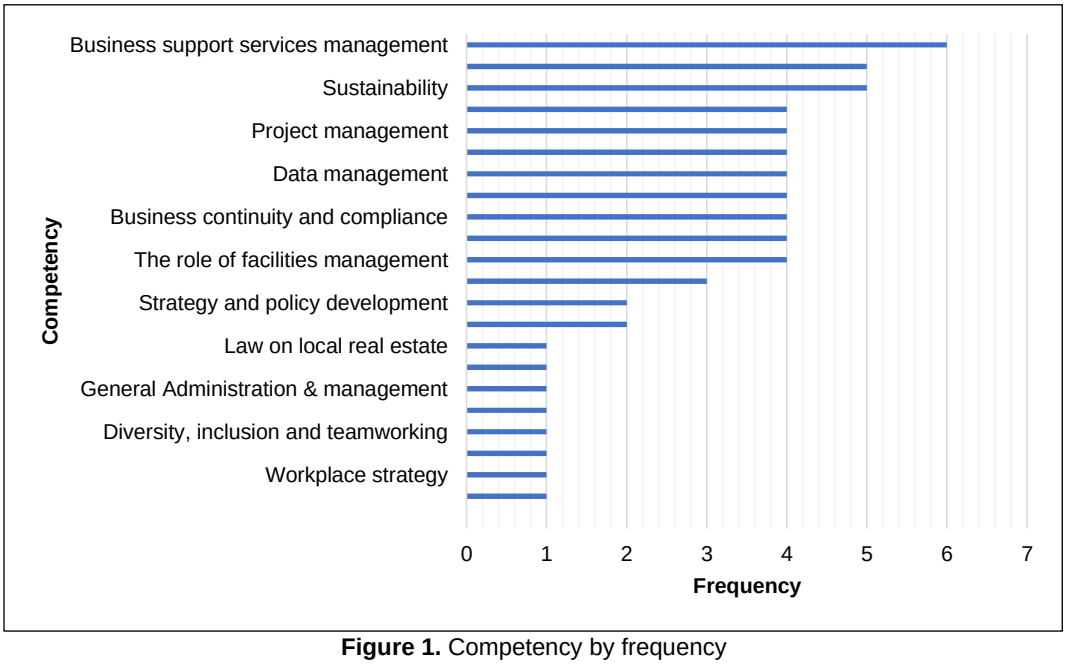

Figure 1. Competency by frequency

Constraints in Managing Facilities of the Higher Educational Institution

It is interesting to note that managing facilities in a higher education institution is complex and challenging, especially when dealing with public institutions. These constraints can be internal, externally, or within the industry.

Firstly, there are many bureaucracies involved. Thus, the facilities manager and the team must be well versed in current policies and strategies. This is because any decision making might need to go all the way to the ministry and other stakeholders.

Secondly, facilities management is aimed to support the core business. Hence, the facilities management team must handle big data. All the facilities must be dependability, i.e., able to be used as and when needed. This is not an easy task as the team would typically use software to manage all the facilities. The inventory of the facilities must be comprehensive, up to date, and not fragmented across different departments. The difficulty might arise when dealing with the users' diverse requirements, i.e., the programs, the departments, and the faculties.

Thirdly, ageing facilities, and financial constraints in managing the physical assets. The challenges are exceeded by inadequate monetary resources, technological revolution, and changing student demographics (Marmolejo et al., 2007). Besides, due to the government's reduction of funding, public higher education institutions are expected to generate their income to support daily operation and development through commercialisation, patent, income generation, rental, and alumni might contribute to the overall revenue. Not only that, but they also have to propose comprehensive strategic planning, supported by a short-term and long-term plan (Balcar, 2014).

Fourthly, expanding capacity either the resources or workforce. Among the significant issues and trends impacting the future of higher education that the industry is facing include scarcity and affordability of resource, performance measurement, accountability, sustainability, energy and environmental resource management, laboratory and classroom spaces. Customer service, IT, facilities reinvestment, and total cost of ownership, workforce management, demographics, and safety, security, and business continuity are also some of the issues arisen (Suttel, 2007). Hence multitasking is the solution to the scarcity.

Fifthly, this is more towards the soft skills of an individual. The facility manager must have the right behaviour and attitude to ensure that the team is motivated, independent, and able to deliver with limited resources. Jabareen (2009), in his research, revealed that soft skills are linked with salary returns and contribute to the elimination of the gender wage gap.

Table 3 below summarises the constraints discussed above. From these constraints, it is possible to identify the gap, i.e., knowledge needed to fill in the gap; hence, the framework's added competency.

Table 3. Summary of the constraints and knowledge needed as an added competency

	Constraints	Knowledge needed	Added Competencies
1	Bureaucracies	Policies and Strategies	Current Government policies and strategic management
2	Techniques	Tools	Technology-related tools
3	Financial constraints	Budgeting and income generation	Business strategy and asset strategy
4	Capacity and capability	Multi-tasking	Multi-tasking skills
5	Behavioural and attitude	Soft skills	Soft skills

The Development of a Conceptual Competency Framework

Competencies criteria established are the synthesis of the literature review by the researchers and the existing institutions' existing competencies. Table 4 below summarises the level and categories that formulate the competency criteria, which is vital for managerial and supervisory effectiveness, as suggested by Mulder (2001); Executive brief (2008); Salleh et al. (2015).

Table 4. Summary of level and category of competencies

	Level	Category of Competencies	ICEBERG competency framework	Core competencies for federal facilities assets	OECD competency framework
1	Level of Decision-Making, Responsibilities, and Authorities	Administrative Competencies	-	Business	Strategic
2	Level of Internal Personnel Inter-Action	Communication Competencies	Social role Self-image Traits Motives	Behavioural	Interpersonal
3	Level of Customer Contact and Inter-Action	Supervisory Competencies	Skills	Enterprise	-
4	Level of Physical and Attitudinal Skills and Knowledge	Cognitive Competencies	Knowledge	Technical	Delivering related

Beforehand, the competencies identified were compared to few recognised competency models, namely the Iceberg, OECD, and Federal Facilities Asset Management. The iceberg competency model is widely adapted in management and modified at organisations (Luo et al., 2016). Besides Iceberg, reference was also made to Organisation for Economic Co-operation and Development (OECD) Competency Framework, a known international inter-governmental economic organisation which established a competency framework in 2014 to guide its 36 countries members Economic Co-operation and Development (2014) and core competencies for Federal Facilities Asset Management by National Research Council (2018).

For this paper, the category of competencies, namely the administration, communication, supervisory and cognitive, will be used to categorise the 22 competency items derived previously in Table 5.

Table 5. Category of competency

	Category of Competency	Competency	Frequency
1	Administrative	Quality management and customer service	5
		Finance and IT	
		General Administration & management	
		Data Management	
		Logistic management	
2	Communication	Communications	2
		Diversity, inclusion, and teamworking	
3	Supervisory	Leadership and management	3
		Human factors	
		Ethics, rules of conduct and professionalism	
4	Cognitive	The role of facilities management	12
		Strategy and policy development	
		Business continuity and compliance	
		Legal/regulatory compliance	
		Business support services management	
		Workplace strategy	
		Property portfolio management	
		Procurement and contract management	
		Sustainability	
		Inclusive environment	
		Project management	
		Law on local real estate	

The table above shows the highest frequency of competencies is cognitive or core competencies (12), followed by administrative competencies (5) and supervisory competencies (3) and communication (2). This shows that a heavy weightage is given to the core knowledge of the profession across all the institutions. It is the foundation that will influence the management and delivery of the team. If the foundation is strong, then the team can perform successfully. This is supported by Au-Yong et al. (2017) that a competent manager must not just have relevant academic qualification and sound working experience, but also participate actively in relevant professional body activities.

Figure 2 summarises the competencies classified in Table 5 and the added competencies based on constraints in Table 3. These competencies criteria are suggested for the Facilities Manager in managing the higher education institution.

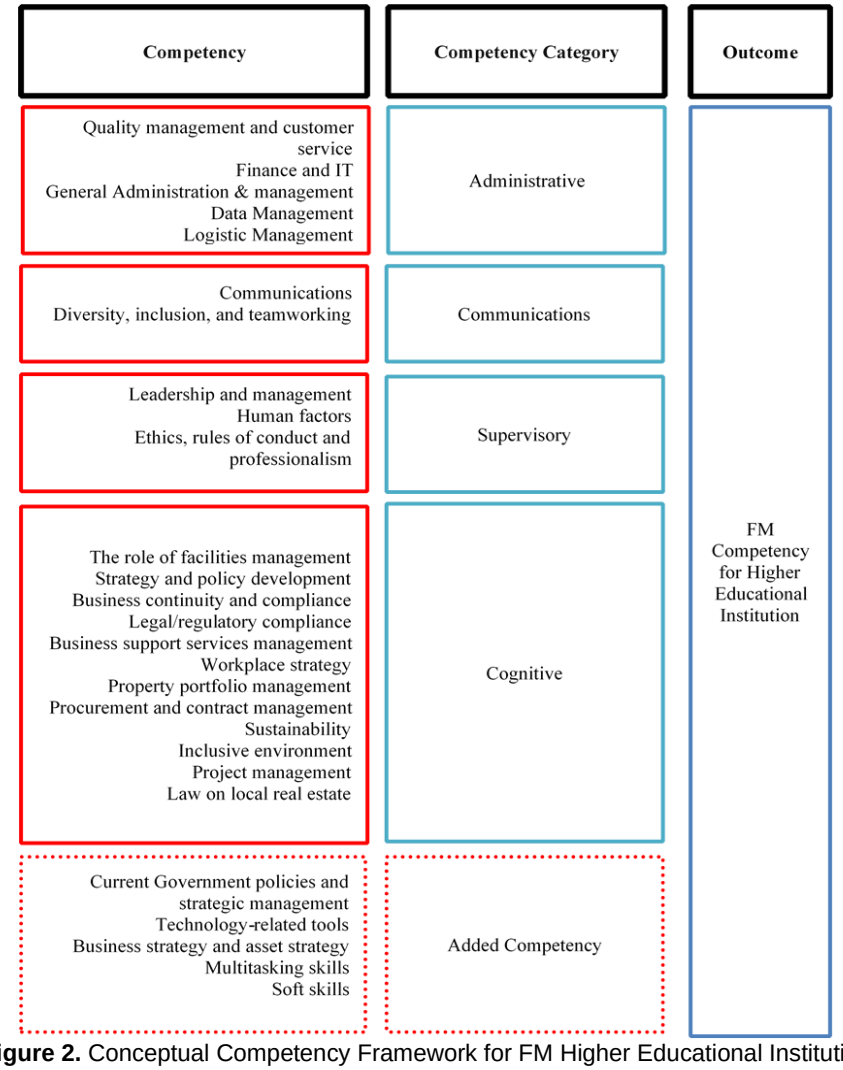

Figure 2. Conceptual Competency Framework for FM Higher Educational Institution

CONCLUSION

The development of competencies criteria for FM, particularly facilities manager in managing the higher education institution, is essential to ensure the services are delivered efficiently and effectively within the users' requirement and budget to meet the vision, mission, and objectives of the institution. The team is commonly working with limited resources and funding, hence making the profession challenging to suit various stakeholders' demands. The study revealed that the highest ranked criteria are typically business support services management adopted by all professional institutions, followed by sustainability, finance, and IT criteria. As for managing the uniqueness of physical assets in a higher education institution, the additional competencies required are the current government policies and strategic management, technology-related tools, business strategy, and asset

strategy, as well as multitasking skills. These competencies are needed to ensure FM is relevant to the institution.

The next step now is for the researcher to verify these criteria using the focus group method that consists of the FM professional, the FM industry, and the FM team in the higher educational institutions. It is hoped that the framework will assist the FM team in managing, training, and keeping up to date with the technology and knowledge in FM. It is also suggested that in the future, competencies established by various other FM institutions and those verified by other scholars are also considered for a more comprehensive study as this research only anticipating competencies from few established FM institutions.

ACKNOWLEDGEMENT

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INEQUALITY OF BARGAINING POWER IN MALAYSIA CONSTRUCTION CONTRACT: A STUDY ON PAM 2006 AND JKR PWD 203A 2010

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Abstract
A construction project must fit by legal aspect view and practise. These include Government regulations that are created in the process of construction. In a construction project, a standard form of contract is a contract between two parties, where the conditions of the contract are set by one of the parties, which the other party has no ability to negotiate more favourable terms as the standard form of contracts violate the freedom of contract. In Malaysia, the two most popular standard form of contract are PWD 2010 by JKR and PAM 2006. The existing standard forms perceived to have inequality in bargaining power. These issues throw doubt on the reliability of the existing standard form of contract and seem to not meet the desire of a particular contract. Therefore, this research was prepared to investigate the inequality of bargaining power in the existing standard form of contract in the perspective of procedure and time given to the contractor as the contract obligation. This research has been done through document analysis in which PWD 203A and PAM 2006 by using Thematic Content Analysis (TCA). The finding shows that inequality in bargaining power exists in both contracts. It can be concluded that the bargaining power in the existing form of contract still exist even though it might be minor, but practically, the contract still can be used without any doubt.

Keywords: *Standard form of contract; inequality; bargaining power; time; procedure.*

INTRODUCTION

The construction industry is one of the largest sectors that contributes significantly to the developed nations on a large scale. It also plays a substantial role in determining economic growth of the country. This industry caters to both the public and private sectors. There are many construction professionals actively involved in the construction industry including the client, contractor, architect, engineer and quantity surveyor. A construction project must fit by legal aspect view and practise which include Government regulations and obligations that are created in the process of construction. Contract is one of the most vital elements in a construction project and it is important for the contracting parties making the contracts to fulfil their obligation therein in order to avoid future dispute.

Standard forms of contract are usually in a printed form where it is drafted and published by an authoritative body of the industry that is recognised by government and construction industry parties. These forms set out the terms and conditions on which the contracts between the parties' obligations are to be carried out. It is also to be noted that these terms or conditions are deemed to be agreed and are not subject to further negotiation and/or amendment (Singh, 2011). A standard form of contract is a contract between two parties, where the terms and conditions of the contract are set by one of the parties, and the other party has no power to negotiate more favourable terms. Hence, some might argue that the standard form of contracts violates the doctrine of freedom of contract, being a set of one-sided agreements or promises between parties since many of the terms were not agreed to in the real sense, made up of a set of fixed terms with almost no room to cater for future change to the needs of the contractual

parties. In Malaysia, there are two most popular standard form of contract which are PWD 2010 JKR and PAM 2006. Throughout the years, modification of the standard form of contract has been done progressively to suit contract terms and conditions while matching with current construction development (Sundra Rajoo, 2014).

This study focuses on the bargaining power in the standard forms of contract particularly in respect of time and procedure given to the contractor as their obligation to fulfil the contract. Despite variety of standard forms available, there are still some flaws on the use of standard form of construction contract in Malaysia.

Problem Statement

The perception is that a person who enters into a contract with free consent is bound by what has been agreed to, unless there are elements of fraud or duress or even misrepresentation and undue influence. These impose standards of proof that parties alleging such vitiating factors usually find it impossible in reality to overcome. Yet, because a contract is in favour of one party it is no basis for its enforcement to be denied. It has long been acknowledged that inequality of bargaining power is a fact of life in the creation of and reliance on contracts (Bhang Singh, 2016).

In Malaysian construction industry, there are various kind of Standard Form of Contract published by the government and professional bodies. They are PAM, PWD 203A, CIDB, IEM and others which the main scope of the contract term usually provide conditions on time, procedure in works, quality of works, remedies and others. Several modifications and amendments have been done to standard forms in order to governing the conditions of contract outlined the criticisms of the traditional standard forms of contract in several respects which include length and complexity, language, revisions, amendments, lack of interface and problems of interpretation (Nee et al., 2014). In construction industry, standard form of contract has been adopted as basis of the contract which consists of conditions that covers all matters so that the employer and contractor clearly understand their rights and obligations. If necessary, amendments of printed text or clauses made to suit the building owner's qualification. In order to avoid any ambiguities with other clauses or documents, those amendments must be done carefully.

Since 1980 and until today, one of the main problems that was discussed in contract law was the freedom of contract (Sundra Rajoo, 2014). Unfairness in contract may arise during a bargaining process or a result out of that process itself. A procedural unfairness happens when there is a flawed happen during the bargaining process. The outcomes of the bargain could also be unfair, and this unfairness is referred to as substantive or contractual unfairness.

It was concluded that unfair contract was acknowledged on the basis of standard form of contract and the source of the unfairness comes from the monopoly power favoured by the party in advantage especially on terms related to time and procedure in works. In regards of freedom and fairness of contract, some may argue that the standard form has neglected the rights of some contracting parties. The problem may arise when the client disputes and violates the terms of the contract between the client and the contractor and especially when the terms of the standard form are biased and in favour of the client. There is a tendency that

the client may manipulate the terms especially on time and procedure in works to his advantage and to the disadvantage of the contractor.

Aim of Study

The aim of the research is to establish whether there is inequality of bargaining power in the standard form of contract in Malaysia.

Scope of the Research

The scopes for this study will focus on the aspects where there will be an investigation of inequality bargaining power that may exist in the standard forms of contract in Malaysia particularly the PAM 2006 and PWD 203A contracts. Duty of the employer and the contractor will be investigated in respect of time and procedure as the parameter of this investigation. It is because the PAM 2006 and PWD 203 are widely used by many parties in Malaysia and it is known that in PAM 2006, there are 11 clauses and 26 clauses related to time and procedure respectively meanwhile for PWD 203A contract, there are 19 clauses related to time and 23 clauses related to procedure.

LITERATURE REVIEW

There are many parties involved in construction projects within construction industry. To ensure the procedures and processes are complied, construction projects must be executed and delivered on time, within the targeted budget and high-quality assured. Mainly, the parties including the employer, contractor, consultants, sub-contractor and suppliers have their own motivations and goals which may not aligned. Therefore, a contract needs to be personalized and agreed by contracting parties to pursue the alignment so that they will achieve a common agreed goal (Jatarona et al., 2016).

Numerous standard forms of contract as a basic legal framework in construction contracts are available. These have been drafted and developed by Authoritaties and professional bodies such as Jabatan Kerja Raya (JKR), Pertubuhan Arkitek Malaysia (PAM) and Construction Industry Development Board (CIDB). The standard form of construction contracts acts as a basic legal framework and each institution has developed a standard form addressing different types of construction project, various clauses and parties' roles for certain construction projects (Nagayam & Pathamavathy, 2005). In spite of having various standard form of contract as contracting system that aimed to have standardized contractual clauses, their adoption has lead to major amendments and modifications. Therefore, it will risk the consistency, efficiency and familiarity of the contractual forms. Thus, the key to successful project can be achieved by drafting a construction contract properly.

Contract is one of the most vital elements in a construction project and it is important for the contracting parties making the contracts to fulfil their obligation therein in order to avoid future dispute. A contract is an agreement that is legally enforced. Typically, there is and offer and acceptance between two parties (Murdoch & Hughes, 2000). A contract as "an exchange of promises between two or more parties doing or refraining from doing an act which is enforceable in a court of law" (Han, 2010).

Basically, a contract is when two or more persons do a voluntary agreement, and which must be legally valid and enforceable. It is applied only to the persons in the contract which the rights and obligations created by the contract, and not to anyone else. There are four basic legal requirements of contract where there must be an offer, an acceptance, intention to create legally binding agreement and consideration (Ndekugri & Rycroft, 2009). An offer is a statement of willingness to enter into a contract and once it is accepted by the other party, its intention is to be binding on specified terms.

Furthermore, an offer also must be certain and sufficiently definite. When an offer is made, the offeree must accept in accordance with its actual terms if it is an intention to form an agreement. All the terms in the offer must be well matched and accepted. An offer can be accepted by conduct and only the offeree has the dominance of the acceptance. The offeree must accept the offer within the specified time and reasonable manner as indicate by the offer. When an offer has been proposed by the offeror, withdrawal can be made before it is accepted. To ensure the withdrawal to be effective, the offeror must inform on withdrawal of offer to the other party.

In Malaysia, standard forms of contract are commonly known as the general conditions of contract that have been put together in a contract document. The standard forms of contract identify the key to contract documents are Articles of Agreement, Conditions of Contract, appendices, drawings and bills of quantity and these forms originate from numerous parts of construction industry (Murdoch & Hughes, 2000). Standard form of construction contracts presents the parties and professionals an apparent and clear understanding on their roles and obligations (Singh, 2011).

Currently, the JKR form is normally used in Public work projects and as an alternative contract for the private sector is the PWD 2010, meanwhile PAM 2006 commonly been used for private projects. Both form of contracts is very significant in our country as many contracting parties in construction project rely on the contracts in making agreement between parties. Both forms include certain non-negotiable terms and conditions where parties must comply and to certain extend it is, easier for the contracting parties as it is easier for them to understand and comply with the agreed terms. Hence, there is no need for parties to draft new agreement and the potential of uncertain terms are definitely reduced. The contract terms are generally well understood by parties involved in construction, the governing bodies and regulators have developed the standard form of contract which address specific contract terms and clauses. (Atiyah, 1995).

However, in regard to the doctrine of freedom and fairness of contract, it may be argued that the standard forms have not appropriately served certain parties rights (Sundra Rajoo, 2014). The problem may arise when the client disputes and violates the terms of the agreement between the client and the contractor especially when the terms of the standard form contract are biased and in favour of the client. There is a tendency that the client may manipulate the terms to his advantage and to the disadvantage of the contractor. Therefore, in this regard, the other parties will always be pointed as the parties does not comply with the agreed terms agreed is although it is a non-negotiable term and does not have equal rights between parties. It is recommended to take several amendments on this contract so that the other parties may have a consideration in several circumstances that need negotiation.

The allocation of risks in PWD203 forms of contract are generally distributed to the contractors (Davis Langdon & Seah, 2012). They believed the forms tend to be biased on the Government's favour. The standard form of contract as "take it or leave it" contract where there is no room to negotiate. Generally, the terms and conditions of the contract are drafted by one party and the other signed without having the terms changed (Dutta, 2016). Therefore, the standard forms eliminate the bargaining power of the weaker party and give chances for the stronger party for exploitation. Even though the client may have power to determine the terms, however, the right of contracting parties must be balanced the objective of construction's contract is for the parties to be in a win-win situation as each party deserved to enjoy the consideration from the mutual contract.

Dispute arises when an issue fails to be resolved by open discussions or mutual application between the parties on the terms and conditions of the contract they have entered. It also to be understand that obscurities and discrepancies in the contract document are the major source of disputes. The clause that may lead to the imbalance of equality if there is no negotiation allowed particularly in such provision which relates to time and procedure. Therefore, in the event where dispute arises it may drag time in process of final account, and extra cost will be incurred by the parties to seek legal advice and reliefs from arbitration. Hence, should parties able to negotiate on the respective terms and agreed on the same ground, the contracting parties may avoid such situation. It can be said that most of the cases is regarding above matters nowadays.

METHODOLOGY

Preparation of Research Proposal

The current trend and issues were observed and the through journals and the problem statement, aim, objective and the scope was identified and determined based on the issues.

Literature Review

In this chapter the researcher uses secondary data that is provided from journals that have mostly been retrieved from journals, trusted web, books from local library and student papers from universities as the main source. The researcher will synthesise the important data according to the guiding concept of research.

Method of Data Collection

In this research the analysed both PAM 2006 and PWD 203A form of contract. There are 39 clauses in PAM 2006 and 81 clauses in PWD 203A. The determination of bargaining power was obtained through the obligation of client and contractor in provisions that related to time and procedure.

There are 2 rules of interpretation used in order to interpret the manuscript which are "prevail over standard" and "read the contract as a whole". Then the researcher used thematic content analysis as the tools of the research. The PWD form were produced by the public work department which the forms are formally approved by the Malaysian Attorney General's Chambers and the revision of the form have been made with the latest updates that was

gazzated on June 2011 meanwhile PAM 2006 was published by Pertubuhan Arkitek Malaysia(PAM) and Institution of Surveyors of Malaysia (ISM) which the contract was origin from JCT 63 then it is revised to PAM 1998 and it is finally resulting produced the latest updated of the form which issued on 2006 as PAM 2006 which it is widely used for private sector construction work.

RESULTS AND DISCUSSION

There are thirty-nine (39) Clauses in PAM 2006 and eighty-one (81) Clauses in PWD 203A, only Twenty-four (24) Clauses in PAM 2006 and thirty (30) were relevant to the discussion which are in the area of 'time' and 'procedure'.

Table 1. Table shows the Clauses summary of provisions on Time and Procedure

PROVISON IN TIME CLAUSES					PROVISON IN PROCEDURE CLAUSES			
	PAM 2006 Standard Form of Contract		PWD 203A Standard Form of Contract		PAM 2006 Standard Form of Contract		PWD 203A Standard Form of Contract	
No.	Clauses	Inequality of Bargaining Power	Clauses	Inequality of Bargaining Power	Clauses	Inequality of Bargaining Power	Clauses	Inequality of Bargaining Power
1.	2.4	√	13.1(a)	X	15.3	√	5.2	X
							5.3	√
2.	3.5	X	15.3	√	15.4	√	24.1	X
					15.5	√	25.1	X
					15.6	√	25.3	X
							28.6	X
3.	23.4	X	15.4(a)	X	16.1(a)	X	31.1	X
					16.1(d)	X	31.3	X
					16.1(f)	X	31.5	X
4.	23.9	X	16.1(b)	X	23.1(a)	X	38.5	X
					23.1(b)	X		
					23.3	X		
5.	25.5	X	18.2	√	24.1(a)	X	38.6	X
					24.1(b)	√		
6.	26.4(a)	X	28.3	X	25.2	X	39.2	X
							39.3	X
							39.4	X
7.	26.5	X	28.6	X	25.6	X	43.1	X
					25.6(a)	X		
					25.6(b)	X		
8.	27.5	X	38.1	X	26.2	X	44.1	X
							44.2	X
							44.3	√
9.	30.6(a)	X	38.2	X	26.6	X	48.1(a)	X
					26.6(a)	X	48.1(b)	X
					26.6(b)	X		
10.	30.6(c)	X	38.2	X	27.6	X	51.1	√
11.	30.6(d)	X	38.4	X	30.1	√	55.0(a)	X
							55.0(b)	√
12			39.1	X	30.7	√		
13			40.1	√	30.10	X		
					30.10(a)	X		
					30.10(b)	X		
14			42.1(a)	X				
15			42.1(c)	X				
16			50.2	X				
17			51.2	X				
18			52.1(a)	X				
19			53.1	X				

From the analysis, it is clear that inequality of bargaining power does exist in both standard forms although in small number. These findings confirm there is existing of inequality of bargaining power. It is happened because in Malaysia, the printed documents help a lot in making the agreement between the parties. Both forms include certain terms of conditions which involving no negotiations about it, so it makes the works easier and smoothly works with the flow as the term is agreed and easily understand by all the parties involved. Only one party need to be drafting and the other party no need to worry about uncertain terms in the contract.

The contract is basically drafted by one party and the other party just signed without changing the terms. Thus, it eliminates negotiation and fair distribution of risks between the contracting parties. The stronger party has more advantages than the weaker party as the contract is in his favour. It is recommended to take several amendments on this contract so that the other parties may have a consideration in several circumstances that need negotiate. Even though the client or employer may have power to determine the terms and condition it should not exceeding the capacity of equality as the construction objective is about a win situation for both parties as each party deserved to enjoy the consideration from the mutual contract.

CONCLUSION

It is concluded the objective has been achieved through document analysis. Analysis was done by comparing two commonly used standard form of contract which are PAM 2006 and PWD 203. Duty of employer and contractor were analysed in both standard forms with the provisions of time and procedure were used as the parameter.

Table 2. Time Provision

Standard form of contract	Total number of clauses	Total number of time provision	Time provision in compliance with inequality of bargaining power
PAM 2006	38	11	1
PWD 203	81	19	3

Table 3. Procedure Provision

Standard form of contract	Total number of clauses	Total number of time provision	Time provision in compliance with inequality of bargaining power
PAM 2006	38	26	7
PWD 203	81	23	4

From the analysis, it is shown that PAM 2006 Standard Form had a greater compliance in inequality of bargaining power than PWD 203 Standard Form in procedure provision. Conversely, PWD 203 Standard Form had a greater compliance in inequality of bargaining power than PAM 2006 Standard Form in time provision. Relating to above matters it is still subjective to make a judgement whether the standard form of contract violate freedom of the other party or not but in this research, it is clear that the inequality of bargaining power exists even in a small number. In considering whether a standard form contract is appropriate document, it must be understood by the contractor that the power and benefit are not equal as the advantage is more to protect the client as this parties is the one who decided to use and make the contract. As the PAM contract documents provide a significant project role for the

project architect, which may not for government project delivery system. Similarly, those contracts created by the PWD that has developed a series of contracts, which it contends are well balanced and do not favour one particular party in the public work as the government may protect his benefits.

LESSON LEARNED

This research involves the contracting parties such as employer and contractor. With the aid of standard form of contract, these contracting parties plays important role for a successful project. Some recommendations are made by the researcher, so that the parties will together reap the benefits of having it. The recommendations are as follow:

i) When drafting a new contract, the one who drafted it whether the statutory bodies or legal expert should consider the bargaining power and allocation of risks of the contracting parties. It should be fair and balance to ensure a better operation, productivity and relationship between the parties.

ii) Instead of creating a new standard form of contract for a better improvement, it is possible to eliminate operation that are impractical and may lead to disputes.

iii) Construction practitioners need to increase their awareness and knowledge on the existing and latest form of contract; therefore, the best selection can be made to suit the requirements of certain project.

iv) Existing standard form of contract is still relevant to be used by construction practitioners nowadays. As this research has found some issues regarding the bargaining power in current standard forms, therefore it is recommended for the professional bodies who drafted the contract to revised and update the existing standard form of contract.

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PROFESSIONAL NEGLIGENCE IN RELATION TO MALAYSIAN PROFESSIONAL DESIGNERS' SCOPE OF WORKS

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Abstract
Various legal actions for negligence committed by professional designers were reported, due to poor execution of works by the professionals. Accordingly, professional designers need to understand their scope of works and execute their works properly. Failure to do so will expose the professional designers to professional negligence and possible legal actions. This paper is meant to look at possible professional negligence liability in relation to professional designers' scope of works in Malaysia. Quantitative approach of in-depth interview involving experience respondents were conducted, in determining scope of works of professional designers prone to professional negligence. The findings outlined experienced respondents' opinion on professional designers' scope of works within Malaysian designing context possible to cause professional negligence. Understanding such scope of works as illustrated from the findings will enable professional designers' to properly identify potential risks of committing negligence, therefore enabling them to execute their duties and subsequently avoiding liabilities.

Keywords: *Professional designers; professional negligence; scope of works.*

INTRODUCTION

The construction industry is statistically one of the most hazardous industries in many countries (Gangolells, 2010). The construction industry has suffered through a decade of poor design and construction performance (CFMA, 2006; Simonson, 2006; Flores and Chase, 2005). In the construction process, there are many unpredictable factors, so the construction project is a high-risk process. Accordingly, the acceptance of an obligation in a building contract is associated with the acceptance of commensurate risks, namely the risk of being unable to fulfil the obligation because of one's own inadequacy, incapacity, inadvertence or error, or because of interference from outside sources or supervening events (Robinson, Lavers, Tan and Chan, 1996). In particular, designers have been criticised for not being accountable to deliver designs on time, minimising construction change orders, and not giving contractors adequate design directives (CFMA, 2006; Chang, 2002; Rubin, 2004). Some construction industry participants have identified the professional designers as a major source of risk and inefficiency in the design-bid-build process resulting in the current poor delivery of construction services (Chang and Chiu, 2005; HC&O Editor, 2004).

In order to minimise risks related to the execution of professional duties, it is important for professional designers to understand their duties fully. Accordingly, this paper is meant to identify those possible areas of designers' works potentially exposed to be executed negligently. For the purpose of this paper, professional designer's definition is limited to professional architect and professional engineers only.

Research Objective

This paper is meant to outline various aspects of possible professional negligence committal in relation to professional designers' scope of works. The term professional designer used throughout this research is referred to professional designers involved in structural aspects of a building, in the form of registered architect with Board of Architects Malaysia and registered engineer with Board of Engineers Malaysia, particularly the civil and structural engineer. Accordingly, both profession groups involve in the designing works within the Malaysian context, such as architect in a building project and engineer (civil and structural) for infrastructure project. The selection of respondents from both professions will provide a more comprehensive data, as far as professional designers are concerns. With reference to the data analysis, the data gathered was consolidated as replies from professional designers, in line with the objective of the research. There is no need for separation of data into each respondent profession, as this research is not meant to compare the perceptions of architect and engineer on the problem statement. In achieving the objective, in-depth interview sessions were carried out, with the intention of soliciting detail information on the issue from experienced professional designers.

MALAYSIAN LEGAL PROVISIONS ON PROFESSIONAL NEGLIGENCE

List of duties as stated in *Hudson's Building and Engineering Contracts* (Duncan, 1995) provides an overview of duties to be performed by a designer.

i) To advise and consult with the employer (not as a lawyer) as to any limitation which may exist as to the use of the land to be built on, either (inter alia) by restrictive covenants or by the rights of adjoining owners or the public over the land, or by statutes and by-law affecting the works to be executed.
ii) To examine the site, sub-soil and surroundings.
iii) To consult with and advise the employer as to the proposed work
iv) To prepare sketch plans and a specification having regard to all the conditions which exist and to submit them to the employer for approval, with an estimate of the probable cost, if requested.
v) To elaborate and, if necessary, modify or amend the sketch plans as he may be instructed and prepare working drawings and a specification or specifications.
vi) To consult with and advise the employer as to obtaining tenders, whether by invitation or by advertisement, and as to the necessity or otherwise of employing a quantity surveyor. (Engineers do not so often employ a quantity surveyor)
vii) To supply the builders with copies of the contract drawings and specification, supply such further drawings and give such instructions as may be necessary, supervise the work, and see that the contractor performs the contract, and advise the employer if he commits any serious breach thereof.
viii) To perform his duties to his employer as defined by any contract with his employer or by the contract with the builder, and generally to act as the employer's agent in all matters connected with the work and the contract, except where otherwise prescribed by the contract with the builder, as, for instance, in cases where he has under the contract to act as arbitrator or quasi-arbitrator.

With reference to the above list, it can be summarized that the duty of a designer emanated from the contract and provisions of the law. It must be noted that the duties are associated with commensurate risks. As such, designer has to ensure that the duties are performed accordingly. Matters related to professional negligence in Malaysia can be traced to the law of contract as well as law of tort.

Under the law of contract, responsibilities of professional designers' safety can be outlined by the contractual terms. Contractual obligations can be express terms of the contract or implied terms. Terms may be implied as a matter of law (legislation of general application to all contracts) or as a matter of fact (the presumed intention of the parties). Generally, the contractual obligation is a duty to perform services with reasonable skill and care, that is, to the standard of a reasonably competent professional ("Duty of Care in Building Design and Construction", n.d.).

It is stipulated under the contract that the professional designers have to ensure reasonable skill and care, as decided in Bolam v Friern Hospital Management Committee [1957] 1 WLR 582, which is applicable in the Malaysian court ("Bolam v Friern Hospital Management Committee", 1957). This is the most essential rule in the performance of the duties and obligations under the contract. The law implies such duty, in the absence of any contractual terms on the standard of care to be exercised by the designer. Under the common law, the duty of care of professional designers is known as the duty of care for professionals, which include matters related to health and safety. In such circumstances, a person who holds himself as a designer, whether he possesses the qualifications and knowledge or not, impliedly warrants that he is reasonably competent to carry out the duty.

However, if an appointment is made on the basis of specialist capabilities, then the duty will be to perform services with the standard of care that would be expected from a reasonably competent specialist, rather than the standard of a general practitioner operating in that field. On design and build projects (subject to the express terms of the contract) there is an implied term that the building will be fit for purpose. This duty exists provided there is reliance by the client on design decisions taken by the contractor, for example, there is no reliance if the client insists on a particular construction method which subsequently fails ("Duty of Care in Building Design and Construction", n.d.).

Under the law of tort, the professional designers owe a duty of care when it is foreseeable by any reasonable man that a failure act on part of the designer in his duty will affect others. For instance, it is foreseeable by any reasonable man that failure in design will affect the health and safety of users of the building. This principle is stated in the landmark case of Donoghue v Stevenson [1932] AC 562. The facts of the case as follows. Mrs Donoghue's friend bought her a ginger-beer made of dark opaque bottle from Wellmeadow Café in Paisley on August 26, 1928. Mrs Donoghue consumed about half of the bottle. The remainder of the contents was poured into a tumbler, where decomposed remains of a snail floated out. This incident resulted in alleged shock and severe gastro-enteritis suffered by Mrs Donoghue.

Under the principle of contract law, Mrs Donoghue was unable to claim damages resulted from breach of warranty of a contract. The reason is, she was not a party to any contract. As a result, Mrs. Donoghue commenced a proceeding against Stevenson, the manufacture. The

matter was brought up to the House of Lords. In the judgment at the House of Lords, Lord Atkin said:

> "The rule that you are to love your neighbour becomes in law, you must not injure your neighbour; and the lawyer's question; Who is my neighbour? receives a restricted reply. You must take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to injure your neighbour. Who, then, in law is my neighbour? The answer seems to be – persons who are so closely and directly affected by my act that I ought reasonably to have them in contemplation as being so affected when I am directing my mind to the acts or omissions which are called in question."

Applying the principle of Donoghue v Stevenson, it must be noted that the duty of care under the law of tort is owed by the designers to anyone, provided that the above conditions are met. In contrast to contractual duty, duty under the law of tort can extend to any third party. It should be noted that the standard of care may be deemed to be higher if the person is a professional or holds themselves out as possessing a certain level of special skill. In that situation, the standard required would be that type of person would be reasonably expected to have ("Negligence", n.d.).

After duty of care has been established, it is important to prove that the duty of care is breached. In proving such breach, the law has established "a reasonable man" test. Accordingly, it is the duty of the plaintiff to prove that the defendant's acts or omissions falls below the standard of care of "a reasonable man." In the case of Glasgow Corporation v Muir [1943] AC 448, Lord Macmillan defined "a reasonable man" as "an ordinary competent man exercising that particular act. According to Lord MacMillan:

> "... standard of foresight of the reasonable man is, in one sense, an impersonal test. It eliminates the personal equation and is independent of the idiosyncrasies of the particular person whose conduct is in question..."

In the case of a medical man, negligence means failure to act in accordance with the standard of reasonably competent medical men at the time ("Glasgow Corporation v Muir", 1943). There may be one or more perfectly proper standards, and if he conforms to one of these proper standards, then he is not negligent".

Another important element in establishing liability under tort of negligence is causation. Causation has two prongs. First, a tort must be the cause in fact of a particular injury, which means that a specific act must actually have resulted in injury to another. In its simplest form, cause in fact is established by evidence that shows that a tortfeasor's act or omission was a necessary antecedent to the plaintiff's injury. Courts analyse this issue by determining whether the plaintiff's injury would have occurred "but for" the defendant's conduct. If an injury would have occurred independent of the defendant's conduct, cause in fact has not been established, and no tort has been committed. When multiple factors have led to a particular injury, the plaintiff must demonstrate that the tortfeasor's action played a substantial role in causing the injury ("Tort Law", n.d.).

Second, plaintiffs must establish that a particular tort was the proximate cause of an injury before liability will be imposed. The term proximate cause is somewhat misleading because it has little to do with proximity or causation. Proximate cause limits the scope of liability to those injuries that bear some reasonable relationship to the risk created by the defendant. Proximate cause is evaluated in terms of foresee-ability. If the defendant should have foreseen the tortious injury, he or she will be held liable for the resulting loss. If a given risk could not have been reasonably anticipated, proximate cause has not been established, and liability will not be imposed ("Tort Law", n.d.).

It is important to point out liability for negligence advice. By professional designers under tort law of negligence. In Hedley Byrne v Heller [1964] AC 465, legal principle on negligence advice by professionals was established. The defendant was a banker. The plaintiff, through its own bank, send inquiries to the defendant on certain company credit rating ("Hedley Byrne v Heller", 1964). Based on the reply, the plaintiff entered into business deal with the company, but ended up losing £17,000. It was held by the court that when a professional makes a statement in his area of expertise, and knowingly that such statement will be relied upon by the listener, the professional owed a duty to take proper care in delivering the statement. If the listener suffers damages upon acting based on the statement or advice of the professional, the court ruled that the professional may have to compensate the listener. Lord Morris of Borth-Y-Gest stated:

> "I consider that it follows and that it should now be regarded as settled that if someone possessing special skill undertakes, quite irrespective of contract, to apply that skill for the assistance of another person who relies upon such skill, a duty of care will arise. The fact that the service is to be given by means of or by the instrumentality of words can make no difference. Furthermore, if in a sphere in which a person is so placed that others could reasonably rely upon his judgment or his skill or upon his ability to make careful inquiry, a person takes it upon himself to give information or advice to, or allows his information or advice to be passed on to, another person who, as he knows or should know, will place reliance upon it, then a duty of care will arise...in my judgment, the bank in the present case, by the words which they employed, effectively disclaimed any assumption of a duty of care. They stated that they only responded to the inquiry on the basis that their reply was without responsibility. If the inquirers chose to receive and act upon the replies, they cannot disregard the definite terms upon which it was given. They cannot accept a reply given with a stipulation and then reject the stipulation. Furthermore, within accepted principles...the words employed were apt to exclude any liability for negligence."

In short, the case of Hedley Byrne v Heller established the basic principle for pure economic loss liability. Such liability arises under the following conditions:

a) the existence of fiduciary relationship of trust & confidence between the parties;
b) the party delivering the statement understand the risk associated with the statement given;
c) there is a party acted in reliance on the statement, and
d) it is reasonable for the party to rely on the statement.

Lord Bridge in Caparo Industries plc v Dickman [1990] 2 AC 60 elaborated three requirements in establishing sufficient proximity in a misstatements case:

> "The salient feature of all these cases is that the defendant giving advice or information was fully aware of the nature of the transaction which the plaintiff had in contemplation, knew that the advice or information would be communicated to him, directly or indirectly and knew that it was very likely that the plaintiff would rely on that advice or information in deciding whether or not to engage in the transaction in contemplation."

It is submitted that the principles enunciated in Hedley Byrne v Heller [1964] AC 465 and Caparo Industries plc v Dickman [1990] 2 AC 60 are applicable not just within formal setting per se, but its application is also extended to informal conversations. As such, it is important for professionals to possess basic understanding of the law of tort.

While there are laws underlining professional negligence in construction, it is essential to look at the professional designers' perception on the matter. Accordingly, in-depth interviews were conducted to gather the understanding of the designers on professional negligence issue.

IN-DEPTH INTERVIEW ON SCOPE OF PROFESSIONAL DESIGNERS' WORKS POSSIBLE TO CAUSE PROFESSIONAL NEGLIGENCE WITHIN MALAYSIAN CONTEXT

Within the scope and nature of this research, the semi-structured, in-depth interview will best serve the objective of the research in soliciting data from the respondents. The in-depth interview was drafted in a semi-structured form. These factors are taken into consideration in drafting the interview in semi structured form for soliciting the data from the respondents:

a) The respondents are professional designers. Being a professional designer, time is a crucial factor. Semi-structured interview will enable data collections session to be made with focus and avoiding unnecessary time spending.
b) The respondents are professional designers, consist of architects and engineers. The research concentrates on design works involving the professional designers, risk management and the law. These branches of knowledge might be unfamiliar with the respondents, especially the legal matters. Therefore, semi-structured interview will act as guidance and framework in soliciting the data.

The flow of the interview draft started from critical issues identified from literature review and questionnaire survey conducted earlier. Thereon, the interview questions were then formulated. The literature review and questionnaire survey provide useful information in the drafting of the in-depth interview. The interview questions were piloted involving three professional designers, on its construct and face validity and reliability.

The purpose of the interview is to get in-depth information before the main issue before-hand can be adequately apprehended. As such, it is important to have experience professional designers as respondents. Such respondents will be able to disseminate in-depth information based on their experience in the industry. Accordingly, the respondents were selected from list of architects and engineers with practicing experience of 10 years and more. References

were made to respective professional bodies in identifying the suitable respondents. The data collected was analysed by way of thematic data analysis, using Nvivo software.

The respondents for the in-depth interview sessions are professional architects and engineers, registered with Pertubuhan Arkitek Malaysia (PAM) and the Institution of Engineers Malaysia (IEM) respectively. The respondents for interview consist of thirteen (13) architects and seventeen (17) engineers involved in the construction industry with minimum ten (10) years' experience. With reference to the engineers, only civil and structural engineers will be selected, as generally, this group of engineers directly involved in the construction process. Data from architect and engineer will provides clearer pictures on the research problems from the perspectives of both profession which directly related to design works in construction.

With regards to the experience criteria of the respondents in this interview, it was established by the American Institute of Architects (AIA) that a senior architect/designer is defined as licensed architect or non-registered graduate with more than 10 years of experience. He has a design or technical focus and is responsible for significant project activities ("Definition of Architect Positions", 2003).

Accordingly, within this definition, only respondent with experienced of 10 years and more were selected. It is submitted that experienced respondents from architectural and engineering field will gives clearer and in-depth picture of the problems related to professional designers in Malaysia.

ANALYSIS AND DISCUSSION

In the interviews, respondents were asked to elaborate on risks related to professional designers and design works. As a result, various aspects of design related risks were highlighted. Respondents from architectural profession are known as Respondent A, while respondent from engineering profession are known as Respondent E. It is important to gather the data from both profession groups in order to reflect the opinion of professional designers defined in this research. However, for the purpose of analysing the replies, the data collected were grouped as replies from professional designers. Since the research is not meant to differentiate or compare the replies from architect and engineer, there is no need to separate the data collected.

Risks in relation to professional designers and design works as perceived by the respondents are illustrated in Table 1 below. The table also stated number of replies and overall replies percentages. Missing column in the table refers to number of respondents who did not consider the elements stated as risk related to design.

The interview findings highlighted various aspects of professional negligence risks in relation to professional designers' works. Respondent E15 stated that, poor design and negligent supervision were two major risk factors. Respondent E15 illustrated poor design by referring to practice of an engineer in preparing a design without properly considering the load bearing of the land. He said, "it is important for architect to properly calculate the load bearing of land in his design. Fail to do so will resulted in poor design being prepared."

Respondent E14 concurred that negligent supervision as a risk factor in professional designers work sphere. In addition, Respondent 14 added that constant interference on design works by the client as well as failure of the architect to keep proper documentations of his works may also cause risks in design. According to Respondent E14, the client should understand the contractual structure and respective parties' duties. He further added that "...the client attitude in interfering with the design might be due to the attitude of trying to save the project cost. However, this attitude might force the designer to come up with lower design quality." Respondent E12 also agreed that risk related to engineers and design works include client interference with design works. Respondent E12 added another angle of risks in relation to duties of professional designers by quoting insufficient information given by the client during brief as another risk element. This submission was agreed upon by Respondent E13, on which he said, "…insufficient documentations of the architect works and not enough brief by the client are the risks related to engineers and design works."

Table 1. Risks Related to Professional designers and Design Works

	Design Related Risk	Total Respondents	Replies	Percentage (%)	Missing	Percentage (%)	Rank
1.	Negligent supervision	30	17	57	13	43	1
2.	Poor design	30	15	50	15	50	2
3.	Insufficient documentation of the designer's works	30	14	47	16	53	3
4.	Client interference with design work	30	13	43	17	57	4
5.	CCC requirements as added responsibility	30	12	40	18	60	5
6.	Insufficient brief by the client	30	11	37	19	63	6
7.	Risk in contract	30	10	33	20	67	7
8.	Failure to comply with statutory requirement	30	9	30	21	70	8
9.	Low understanding on part of the contractor	30	8	27	22	73	9

Another element of risks identified during the in-depth interview sessions were failure of professional designers to fulfil the statutory requirements and unprofessional attitude of the client. These two elements of risks were cited by Respondent E7.

With reference to architectural practice, similar spectrum of risks was cited by respondent architects, as cited by respondent engineers. According to Respondent A1, possible risks in relation the execution of professional designers' duties includes negligent supervision and insufficient documentation of the designer's works. Respondent A1 stated that it is important for an architect to record their works properly. Proper records of the works will enable the architect to execute their works according to the work plan, as well as safeguarding their interest.

In addition to insufficient documentation of designers' works, insufficient brief by the client was also quoted as possible risk elements. According to Respondent A2, clients' insufficient brief may cause delay in the completion of the design, as the designer will have to revert back to the client for further details. Moreover, if tenders were invited based on the incomplete design prepared based on insufficient brief, most likely the project cost will escalate.

Another risk element raised by the respondents is perceived added responsibility of a "Principal Submitting Person" under Certificate of Completion and Compliance (CCC) requirement in Malaysia. Accordingly, professional designers can be appointed as "Principal Submitting Person" under the requirement. Principal Submitting Person is responsible for the certification of the completion and compliance of a project. 6 engineer respondents and 6 architect respondents stated that this requirement as an added responsibility, in addition to their existing duties and liabilities.

According to Respondent E7, CCC requirement, centralising the responsibility over certification of compliance and completion of a project on a submitting person, placed additional risks to professional designers, as the "Principal Submitting Person" appointed can be an architect or engineer. In the words of Respondent E7 "Engineers is already handful with existing duties to be performed. The introduction of CCC poised more risks to the profession, as it centralised the responsibility of project certification on the engineer."

As a whole, the respondents gave insights on professional designers' scope of works to be properly executed in avoiding possible professional negligence act. Risks related to professional designers and design works can be classified as:

1. Risks emanating from the designers' professional duty
2. Risks originated from the structure of the traditional procurement system widely applicable in Malaysia.

Risks resulted from the execution of the designers' duty can be traced to the contractual terms, duties imposed upon the designers by the law of tort and statutory duty. In addition to the above, the structure of traditional procurement system also resulted into the possibility of risks occurrence. The interviews highlighted the possible areas professional negligence could be committed by professional based on the rank of importance. From the replies, risk elements stated by the respondents can be linked to negligence of the parties related to the project as well as risk related to the traditional procurement route and legal provisions. Negligence supervision, poor design, insufficient documentation on the designer's works, interference by the client, insufficient brief by the client, failure to comply with statutory requirement and low understanding on part of the contractor can be categorized as negligent act by the parties involved in the project. Accordingly, it is important for professional designers to focus and strategize proper risk management practices, prioritizing on critical areas of design related risks.

CONCLUSION AND RECOMMENDATION

Professional designers' works is associated with various risks elements, including the risk of committing professional negligence. Professional negligence liability can cause damaging effect, such as financial disaster, damages to personal and property, and death. Therefore, it is critical for the designer to fully understand their scope of works and execute it properly to avoid such catastrophic effects.

The in-depth interviews reveal several areas of works related to professional designers, exposed to professional negligence if not properly managed. Accordingly, these areas need to be fully understood and executed by the parties. Issues such as interference by client for cost-

cutting purposes and insufficient information poised possible occurrence of professional negligence. Professional designers' need to ensure that each party understand respective duties and enough information to be provided, before embarking with the designing works. Positive steps and measures must be taken by professional designers and other stakeholders to manage such issues.

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THE USAGE OF SOCIAL MEDIA ON SPREADING THE AWARENESS OF LEAN CONSTRUCTION CONCEPT IN THE MALAYSIAN CONSTRUCTION INDUSTRY: PERSPECTIVE OF THE PUBLIC

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Abstract
The internet has emerged drastically in the world of technology. Social media is one of the needs of daily life, especially in communication and interaction between one party with another. In the construction world, social media play a very vital role in exchanging information between the parties that includes client, consultants, contractor, user and the public. Hence, this paper aims to study the usage of social media on spreading the concept of Lean Construction in the Malaysian construction industry in the perspective of the public. Concerning the above point, the level of the different type of social media platform usage is determined. Apart from that, the paper also made to determine the barriers appeared in the use of the social media as well as the ways to improve the usage of social media on spreading the concept of Lean Construction in the Malaysian construction industry based on the public perspective. An exploratory survey which was based on a set of questionnaires was conducted to discover the extends of the usage of social media in the construction industry. The results showed that three main barriers appeared in using the social media in informing the concept of Lean Construction, while three main improvements identified to overcome the barriers occurred in the Malaysian construction industry. The barriers and improvements cover the level of knowledge, connectivity/access restriction and reliability of social media.

Keywords: *Social media; lean construction; the Malaysian construction industry.*

INTRODUCTION

The social media has tremendously increased in about just ten years from its introduction, and that includes the emerging of social media platforms such as Facebook, Twitter, Instagram, WhatsApp, YouTube, Flickr, Tumblr, LinkedIn and more to list. The users are rocketing in number from year to year without fail to decrease (Al-Deen & Hendricks, 2012). The previous statements also can be described as the number of users who are the public; coherently reflects the usage of social media. Relatively, the spreading on the concept of Lean Construction in the construction industry also cannot be excluded from the use of social media on the daily life of the public (Perera et al., 2017).

On the other hand, according to Alwagait et al. (2015), the public or the user of social media consists of a different level of ages, genders, ethnics, and backgrounds. Hence, it can be seen that the usage of social media for some time has led to the arises of several barriers that can withstand and reduce its effectiveness as well as efficiency. This also can be explicitly related to its usage on spreading the awareness of Lean Construction concept. Furthermore, nowadays, the usage of social media has been illustrated in a way that it has been practically used as the medium of communication between the users regardless of its methods (Larcker et al., 2012).

Besides, Lean Construction is a concept derived from the manufacturing industry. This concept is proposed to the construction industry in resolving the issues of construction wastes (Marhani et al., 2018). According to Marhani et al. (2012), Lean Construction is a simultaneous and regular enhancement in the construction processes that capable of in managing the construction wastes. The implementation of Lean Construction also assurances a more excellent quality of the constructed product and will boost its performances too. In spreading the awareness of Lean Construction concept, the social media has been used in many ways in delivering the information and understanding to the public effectively. Hence, this coherently related to the Lean Construction concept and the improvements to the above barriers are needed to be identified to sustain the level of its deliverance implementation.

This paper is intended to identify the improvements that can be made for the use of social media on spreading the awareness of Lean Construction concept in the Malaysian construction industry based on the perspective of the public. This paper is also anticipating accelerating the usage of social media in assisting the escalation of Lean Construction concept in the Malaysian construction industry.

SOCIAL MEDIA ON LEAN CONSTRUCTION CONCEPT

Lean Construction is an alternative concept that can be implemented in the Malaysian construction industry in undertaking the issues of construction waste. Lean Construction is a concept of administering and reconstructing the construction process by eliminating construction waste (Yahya & Mohamad, 2011). Many developed countries have embraced the Lean Construction concept and gained the benefits from its implementation (Marhani et al., 2012). However, this concept needs the construction organisation to use appropriate or acceptable Lean Construction tools to gain the benefits of it.

Meanwhile, according to Vorvoreanu et al. (2013), the definition of social media can be derived as online platforms that can alternately support both one-on-one and mass communication within the system environment. Social media has a different kind of level and platform, and it can be utilised for several purposes such as education, communication, entertainment and collaboration. For instance, Facebook, Twitter, Instagram, WhatsApp and YouTube are examples of major social media.

Nonetheless, there are barriers in the usage of social media in creating the awareness of Lean Construction concept. The implementation of social media in achieving an effect of information deliverance is a complex process that includes various aspects that need to be harmonically synchronised. The involvement of policymakers in terms of outlining the media spaces is vital, and the process is lengthy and complicated. The target of the audience has to be determined by the key stakeholders of an organisation (Lampe et al., 2011).

Furthermore, as social media takes advantage of the word-of-mouth application, this allows the public to engage in a conversation of customer-to-customer. These improvements somewhat can lead to significant and influential tools of marketing on spreading the awareness of Lean Construction concept. Like a shred of extraordinary evidence to support the previous point, Pan et al. (2014) mentioned that the recommendations from existing customers are the most significant source of a new customer based on several studies made. The relation to this argument is substantial towards the Lean Construction concept in

providing information to the public efficiently. In other words, this situation can be described as a 'chain reaction' of information exchange.

In summary, the usage of social media on spreading the awareness of Lean Construction concept can be divided into the different types of platforms that include Facebook, Twitter, Instagram, WhatsApp and YouTube. Several barriers in the usage of social in accelerating the awareness of Lean Construction concept are also discussed in addition to the improvements that can be taken into considerations especially on the level of knowledge, connectivity/access restriction and reliability of social media.

METHODOLOGY

The steps in the research methodology concept are applied to achieve an adequate level of research. As far as data collection is concerned, the quantitative method is chosen to be used in this exploratory research. This research obtained its primary data via a questionnaire survey; meanwhile, the secondary data are obtained from a literature review through journals, articles, books, websites and others. For the distribution of questionnaires, 30 respondents in the area of Klang Valley with various backgrounds, gender and from the age range of 18 to 60-year-old are randomly chosen. 39% of respondents consisted of female, and the remaining 61% is male. The respondents were the user of social media in the Malaysian construction industry, such as Quantity Surveyors, Construction Personals, Post and Undergrad Students (Construction Field), and public audience. Additionally, the data analysis methods for this research are the average index method and descriptive statistics method. The descriptive method includes the level of agreement from 1 to 5, which 1 is least agree and 5 is strongly agree. The interpretation of data for frequency calculation is via the descriptive statistical method; meanwhile, for the level of usage is via the average index method.

DATA ANALYSIS AND FINDINGS

This section discusses findings from the questionnaire surveys regarding the summary of the barriers and improvements on the usage of social media in spreading the awareness on Lean Construction concept in the Malaysian construction industry.

Table 1 illustrates the highest level of agreement for the barriers in the usage of social media in spreading the awareness on the Lean Construction concept in the Malaysian construction industry, is the lack of awareness/exposure of Lean Construction's contents, at an average index of 3.79 and under the classification of Agree (4). Meanwhile, the lowest level of agreement for the barriers in the usage of social media in spreading the awareness on the Lean Construction concept in the Malaysian construction industry is unfamiliar terms/jargons used in the contents that related to the Lean Construction concept and usage of a high level of English that is difficult to interpret and understand, both at an average index of 3.18 and under the classification of moderate.

On the other hand, all the barriers stated are categorised into three main categories. The barrier in the type of reliability of social media scores the highest level of agreement at an average index of 3.60 and classified under Agree (4). The connectivity/access restriction category follows as the second-highest of the level of agreement at an average index of 3.45 and classified as Moderate (3). Finally, the level of knowledge barrier category scores the

lowest level of agreement at an average index of 3.38 and under the classification of Moderate (3).

Table 1. Summary of Barriers in the Usage of Social Media on Lean Construction in the Malaysian Construction Industry

	Descriptions	Average Index	Classification
1)	**Level of Knowledge**		
a.	Unfamiliar terms/jargons used in the contents that related to the Lean Construction	3.18	Moderate (3)
b.	Usage of high level of English that is difficult to interpret and understand	3.18	Moderate (3)
c.	Lack of awareness/exposure of Lean Construction's contents	3.79	Agree (4)
	Average	3.38	Moderate (3)
2)	**Connectivity/Access Restriction**		
a.	Restricted access to the pages/accounts that related to the Lean Construction	3.53	Agree (4)
b.	Lack of access to the internet due to weak network coverage	3.37	Moderate (3)
c.	Data quota restriction due to limited internet plan used	3.45	Moderate (3)
	Average	3.45	Moderate (3)
3)	**Reliability of social media**		
a.	Lack of interest in using social media as user prefers the old fashion way of interaction	3.45	Moderate (3)
b.	Lack of marketing through the social media by the Lean Construction's key players	3.76	Agree (4)
c.	Other platforms offer more convenience and reliable way to acquire the required contents that related to Lean Construction	3.60	Agree (4)
d.	Fear of privacy and security breach	3.60	Agree (4)
	Average	3.60	Agree (4)

(Source: Mahadzir, 2019)

Table 2. Summary of the Improvement in the Usage of Social Media on Lean Construction in the Malaysian Construction Industry

	Descriptions	Average Index	Classification
1)	**Level of Knowledge**		
a.	Maximise the commonly used/layman term usage of the contents	3.82	Agree (4)
b.	Avoid using complex sentences and increase usage of simple sentences for better understanding	3.95	Agree (4)
c.	Follow/subscribe more pages/accounts that related to the Lean Construction	4.00	Agree (4)
	Average	3.92	Agree (4)
2)	**Connectivity/Access Restriction**		
a.	Allowance of public access to the contents that related to the Lean Construction	4.13	Agree (4)
b.	Choosing a better telecommunication company for good coverage of the network	3.95	Agree (4)
c.	Use data plan that provides unlimited data or high amount of quota or use Wi-Fi for internet connection	3.95	Agree (4)
	Average	4.01	Agree (4)
3)	**Reliability of Social Media**		
a.	Administrator of the contents should use a more user-friendly approach to attract users	4.24	Agree (4)
b.	The Lean Construction's key player should promote their content in social media frequently	4.24	Agree (4)
c.	The contents should be broadening with various types of knowledge that related to the Lean Construction	4.26	Agree (4)
d.	Usage of encrypted data and highly secured login authentication for the safety and security use of social media	4.05	Agree (4)
	Average	4.20	Agree (4)

(Source: Mahadzir, 2019)

Table 2 indicates the improvement in the usage of social media in spreading awareness of the Lean Construction concept in the Malaysian construction industry. It shows the highest

level of agreement by the respondents is the contents should be broadened with various types of knowledge that related to the Lean Construction concept, at an average index of 4.26 and under the classification of Agree (4). Additionally, the majority of the level of agreement on the improvements listed are under the category of Agree (4). Meanwhile, the lowest level of agreement on the progress has maximised the commonly used/layman term usage of the contents, at an average index of 3.82 and under the classification of Agree (4).

All the listed improvements are categorised into three main categories. The highest level of agreement category is the reliability of social media, at an average index of 4.20 and under the classification of Agree (4). Furthermore, the lowest level of agreement category is the level of knowledge, at an average index of 3.92 and under the classification of Agree (4).

DISCUSSION

The Barriers that Appear from the use of Social Media on Lean Construction in the Malaysian Construction Industry

Based on the results of the questionnaire survey, it can be said that the first objective is achieved. According to the respondents' level of agreement on each of the main topics in the barriers that appear from the use of social media in spreading awareness on the Lean Construction concept has been identified. As a summary, the barriers that emerge from the use of social media in spreading the attention on the Lean Construction concept are identified as three main topics which are level of knowledge, connectivity/access restriction and reliability of social media.

Level of Knowledge

Most of the respondents Agree (4) with the barrier point of lack of awareness/exposure to Lean Construction's contents under the main topic of the level of knowledge. It is agreed because the Lean Construction practitioners itself lack information sharing on their social media accounts as well as lack of initiatives by the policymaker such as the government to promote the Lean Construction concept via social media. The level of knowledge regarding English and terms/jargon used is acceptable as respondents responded equally to both points. The education in Malaysia has emphasised the English language since primary school; hence the level of education is quite adequate for the respondents to understand English and Lean Construction's Jargons well. Finally, the mean for the average index for the level of knowledge is 3.45, which is under the classification of Moderate (3). Thus, the respondents moderately agree that level of knowledge is one of the barriers in the usage of social media in spreading awareness on the Lean Construction concept in the Malaysian construction industry.

Connectivity/Access Restriction

The majority of the respondents Agree (4) with the barrier point of restricted access to the pages/accounts related to the Lean Construction concept. There is a restriction of access to the pages/accounts that linked to the Lean Construction concept and they exclusively for the Lean Construction practitioners only. Due to this exclusivity, demanding for the public to access and search required information that is contained in the involved accounts/pages. On

the other hand, the respondents Moderately (3) agree with the points of internet data restriction and weak network coverage. This is true because the internet coverage in Malaysia is vastly improved as a high-speed 4G LTE network and fibre optics available in the significant part of Malaysia. In summary, the mean for the average index of the connectivity/access restriction is 3.45, which under the classification of Moderate (3). Hence, the respondents moderately agree that connectivity/access restriction is one of the barriers in the usage of social media in spreading awareness of the Lean Construction concept in the Malaysian construction industry.

Reliability of Social media

Most of the respondents agree (4) with the statement of lack of marketing through social media by the Lean Construction practitioners. There is less appearance of the contents of the Lean Construction concept on their social media newsfeed or timeline. This is due to Lean Construction's practitioners have less tendency in utilising social media to promote their activities to the public. They prefer the traditional way of marketing such as through television, radio and billboard. However, the respondents moderately (3) agree with the statement of lack of interest in using social media as a user prefers the old fashion way of interaction. This is true because there are still several people who like to use a letter, telephone and emails to interact with each other if they cannot interact face to face. Lastly, the mean for the Average Index for the reliability of social media is 3.60, which can be classified as Agree (4). Hence, the respondents agree that the reliability of social media is one of the barriers in the usage of social media in spreading the awareness of the Lean Construction concept in the Malaysian construction industry.

The Improvements to Overcome the Barriers Occurred on the Usage of Social Media on Lean Construction in the Malaysian Construction Industry

Based on the findings, it can be summarised that the second objective is achieved. Referring to the level of agreement of the respondents, the improvements to overcome the barriers occurred on the usage of social media has been determined and recommended. In a nutshell, the improvements to overcome the barriers occurred on the use of social media has been suggested as three main topics which are level of knowledge, connectivity/access restriction and reliability of social media.

Level of Knowledge

The respondents' Agree (4) with the all three points in the topic of the level of knowledge for the improvement in the usage of social media in spreading the awareness on the Lean Construction concept in the Malaysian construction industry. The point of following/subscribe more pages/accounts that related to Lean Construction concept scores the highest Average Index, and this means that the respondents agree that by following/subscribing more pages/accounts that linked to Lean Construction concept can improve the usage of social media in spreading the awareness on the Lean Construction concept in the Malaysian construction industry. The possibilities of the appearance of construction contents increase when more pages/accounts related to the construction are followed, and hence the improvement of social media usage can be achieved. Even though the average index for the point of maximising the commonly used/layman term usage of the contents is the lowest in this topic, the respondents still Agree (4) on this point as an

improvement in term of level of knowledge. This is to increase the understanding and attract more readers in the Lean Construction contents hence increase its usage. Lastly, the mean for the average index for this topic is 3.92, which is under the classification of Agree (4). Hence, the respondents agree that level of knowledge is one of the main issues of the improvements of social media usage in spreading awareness on the Lean Construction concept in the Malaysian construction industry.

Connectivity/Access Restriction

On the topic of connectivity/access restriction, the majority of the respondents Agree (4) with all the three statements, which statement of allowance of the public access to the contents that related to the Lean Construction concept has the highest Average Index and the other two views share the same average index. Furthermore, the results prove that the respondents have the intentions and want to access a variety of sources of information related to the Lean Construction concept. The restriction needs to be lessened as to make the information related to the Lean Construction concept becomes available for the public access and hence increase the usage of social media in spreading the awareness on the Lean Construction concept in the Malaysian construction industry. Additionally, the improvement in the coverage of the internet based on the telecommunication companies is essential as this is the root factor for the public to use the internet. Better reception of internet coverage will encourage the public to use social media, and this leads to the contents of the Lean Construction concept to be accessed and hence increase its usage. Finally, the tabulated data shows that the mean average index for connectivity/access restriction is 4.01, which under the classification of Agree (4). Therefore, the respondents Agree (4) that the connectivity/access restriction is one of the main topics for the improvement of social media usage in spreading the awareness on the Lean Construction concept in the Malaysian construction industry.

Reliability of Social media

All the above statement has the same classification level of agreement. The majority of the respondents Agree (4) with those four statements, and the first rank of the information which is the contents should be broadening with various types of knowledge that related to the Lean Construction concept has the highest average index among all. This improvement is significant because the audience, which is the respondents always expecting and demanding more variety of contents from the Lean Construction concept. The presentation of the contents should be more interactive and exciting to attract more audience to keep following the contents of the Lean Construction concept via social media. Besides that, the aspect of security is also crucial in improving the usage of social media in spreading the awareness on the Lean Construction concept as the fear of security and privacy breach will hinder the audience from viewing the contents. The contents of the pages/accounts related to the Lean Construction concept should be well filtered from spams and links that lead to the exposure of malware and viruses to the audience. Safe and secure internet environment will promote more audiences to use the social media in the Lean Construction concept and hence will improve the usage of social media in spreading the awareness on the Lean Construction concept in the Malaysian construction industry. Finally, the mean of the average index for this main topic of reliability of social media is 4.20, which under the classification of Agree (4). Thus, this shows that the respondents Agree (4) that the reliability of social media is

essential as the one of the main topics for improvements of the social media usage in spreading the awareness on the Lean Construction concept in the Malaysian construction industry.

CONCLUSION

The conclusion is made based on the analysis of the findings of the collected data via a questionnaire survey. From the analysis of the results, three main topics for the barriers that appear from the use of social media in spreading the awareness on the Lean Construction concept in the Malaysian construction industry has been identified which are level of knowledge, connectivity/access restriction and reliability of social media. In terms of the level of knowledge, the public mostly agreed on the lack of awareness/exposure to Lean Construction's contents. The public moderately agreed on the unfamiliar terms/jargons used in the contents related to the Lean Construction concept. In terms of connectivity/access restriction, the public mostly agreed on the restricted access to the pages/accounts related to the Lean Construction concept. Meanwhile, the public moderately agreed on the data quota restriction due to limited internet plan used. In terms of reliability of social media, the public mostly agreed on the lack of marketing through social media by the Lean Construction practitioners. The public moderately agreed on the lack of interest in using social media as the user prefers the old fashion way of interaction.

Based on the findings, three main topics are recommended as improvements to overcome the barriers that occurred on the usage of social media. The issues are based on the barriers in the second objective, which are level of knowledge, connectivity/access restriction and reliability of social media. In the aspect of the level of knowledge, the public mostly agreed on the following/subscribing more pages/accounts that related to the Lean Construction concept. Besides, the least agreed by the public is to maximise the commonly used/layman term usage of the contents. In the aspect of connectivity/access restriction, the public mostly agreed on the allowance of public access to the contents related to the Lean Construction concept. Meanwhile, the public least agreed on the usage of a data plan that provides unlimited data or a high amount of quota or uses Wi-Fi for internet connection. In the aspect of reliability of social media, the public mostly agreed on the broadening of the contents with various types of knowledge related to the Lean Construction concept. The public least also agreed on the use of encrypted data and highly secured login authentication for the safety and security use of social media.

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RELATIONSHIP BETWEEN QUALITY OF WORK LIFE (QWL) AND JOB SATISFACTION AMONG EMPLOYEES OF A PROJECT MANAGEMENT CONSULTANCY IN MALAYSIA

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Abstract
The construction industry is a powerful and stressful industry which mostly involve tight control and supervision. Poor and ineffective management would result in employees to have extended working hours; disturbing their work-life balance thus, developing the dissatisfaction in them. Quality of Work Life (QWL) and job satisfaction are critical concerns for the human resource management in any organizations as employees nowadays tend to choose job that is not only financially beneficial, but also socially and emotionally balanced. Some studies deduced that QWL and job satisfaction as synonymous, however majority of the management science experts and industrial psychologists have confidence that job satisfaction is a result of QWL. The purpose of this paper is to identify the factors contributing towards Quality of Work Life and to determine the relationship between Quality of Work Life and Job Satisfaction. The exploration is done by collecting data from 250 employees of a project management consultant in Kuala Lumpur, Malaysia. Descriptive analysis and Pearson's correlation analysis are used to analyse the data. The study reveals that the respondents evaluated QWL in the organization and the level of job satisfaction as moderate. The results also show that there was a significant relationship between QWL and job satisfaction in the organization. These empirical findings help the organizations to understand the differences QWL of different level of management so as to develop appropriate strategies for its improvement.

Keywords: *Construction industry; quality of work life; job satisfaction; project management consultant.*

INTRODUCTION

Quality of Work Life (QWL) is among the broad and current topics in most organizations these days. For organizations to boost their reputation in attracting and retaining employees, offering good quality of work life might be handy (Noor & Abdullah, 2012). Personal well-being is not a matter that used to be overlooked nowadays. Employees these days are more conscious and sensible towards their own welfare. Good salary, considerable workload and non-hectic schedule are among the qualities that are more likely preferable when an individual goes for job hunting. Thus, organizations that promises great benefits and quality of work life are likely to retain their staffs for a long time (Anbari et al., 2014). Quality of Work Life comprises of various factors such as working environment, staffs' welfare, job satisfaction, home-work interface, workload and right of speech (Walton, 1980). Reasonable rate of salary, harmless working surroundings, good relationship with colleagues and receiving appreciation from employers are among other components that may affect the quality of work life; leading to contentment of employees in working (Gupta & Sharma, 2011, Muskat & Reitamer, 2019).

As early as 1980, various studies have been conducted regarding quality of work life and job satisfaction. Based on the results and analyses, there is a positive connection between both variables. Employees' satisfaction has been a rising issue and are being emphasized between management of organizations. Job satisfaction can be deduced as an insight, encouraging attitude and feelings, or perceptions of individuals towards their career. Working

environment, organizational structure and socio-demographic are among the elements that may influence the level of job satisfaction (Armstrong, 2006). Majority of the organizations claim that people are their most important asset and strength. This can be seen in their vision and mission along with the aims and objectives of the business, which does not leave out the elements of staffs' wellbeing.

Some studies deduced that QWL and job satisfaction as synonymous, however majority of the management science experts and industrial psychologists have confidence that QWL and job satisfaction differs in terms of concept. In their point of view, job satisfaction is a result of QWL (Sirgy et al., 2001). While in another study, the performances between companies that are known to have high quality of work life were compared and the results revealed that QWL had a deep impact on the employee's job satisfaction (Lau, 2000). Although job satisfaction and QWL are viewed as agents of organizations' development in many studies, few researchers are directly address the QWL of construction workers. Therefore, an empirical investigation is required to investigate the relationships between construction workers QWL and job satisfaction is paramount.

LITERATURE REVIEW

The construction industry is often labelled as a very tough industry due to the involvement of a wide range of tedious and interrelated activities and having to deal with various parties consisting of the professionals such as architects, engineers, contractors, surveyors, suppliers, etc. In effort to keep up with the pace of competitiveness, efficient organization management is essential to survive in this highly fragmented industry. The necessities for such approach have become more vital and distinct due to advancement of the construction industry with involvement of international companies and emergence of many mega projects. Hence, Project Management Consultant (PMC) services is one of management solutions that are widely used to improve the effectiveness and efficiency of a construction project (Ismail, 2005).

As years passed by, the use of PMC services has considerably increase making them as one of the important parties in the construction industry. Involvement of PMC in construction is not only known in Malaysia, but also worldwide. In a typical engagement, a project management consultant functions as a representative and advisor to the project's client. Their job scope includes leading, coordinating, supervising and managing the project towards achieving the project's objectives (Chartered Institute of Building, 2002). The usage of PMC bodies in construction industry can be considered as new in Malaysia. It started to be applied only after the completion of Petronas Twin Tower and the Kuala Lumpur International Airport (KLIA) projects. This study is conducted to find out the relationship between QWL and job satisfaction among employees of a leading multidisciplinary project management consultant in Malaysia.

Employees are the most important resources of a company as they are the ones that drive the business forward. Despite human being the main pillar of the sustainability of an organisation, they are also the most neglected resources. They are often taken for granted and in worse cases, they are being treated badly by their superiors. Commonly, leaders will be credited for organisational success, while subordinates become scapegoats for organisational failures. Along with the technological advancement of the world, the art of motivating people

in organizations in drastically losing its identity. This will cause employees to feel demotivated to perform their task, deteriorating their value of work life, thus leading to dissatisfaction in their career. In the construction industry, job dissatisfaction issues may seem insignificant compared to other technical issues such as extension of time or cost overruns. However, low level of performance resulting from job dissatisfaction could therefore be costly not only to the project, but the organization itself (Ngonde, 2015).

Referring to previous study by Chitra & Mahalakshmi (2012), ten variables are considered to measure quality of work life namely support from organization, work-family conflict, relationship with peers, self-competence, impact of job, meaningfulness of job, optimism on organizational change, autonomy, access to resources and time control. From their study, the researchers discovered that each of those QWL variables is a significant aspect of job satisfaction. This indicates that there exists a relationship between quality of work life and job satisfaction.

Not only limited to job-related traits, QWL focus on employees thoroughly. There are various concepts and thoughts on QWL and its dimensions. Some interpret it as simple as earning salary that is sufficient to provide for their basic daily necessities, while some wants the right and opportunity in being able to make decisions for the company. There are also people who look at it as a development in the socio-psychological traits of work. Generally, QWL is a prescriptive theory to safeguard the benefits and welfare of employees by designing working environment with maximum concern (Jaiswal, 2014). Walton (1980) proposed eight dimensions in which employees' insights towards their work organizations could affect their QWL: 1) adequate and fair compensation, 2) safe and healthy environment, 3) development of human capacities, 4) growth and security, 5) social integrative, 6) constitutionalism, 7) total life space and 8) social relevance.

Retention of staff can be boost by employees' satisfaction towards their job and decrease the possibility of staffs' turnover (Chitra & Mahalakshmi, 2012). Job satisfaction is commonly defined as pleasure and contentment of an individual towards their position, tasks assigned to them and the working environment. Companies need to be bold and prepared to face challenges in the tough construction industry for the sake of the company's survival and success in the highly competitive environment. Among the greatest challenges faced by companies these days are satisfying their staffs and maintaining good and skilled workers. According to previous studies of the aspects affecting productivity of construction labours, job satisfaction is discovered as the most dominant socio-psychological factor to stimulate workers' motivation. Job satisfaction is not restricted to only improving motivation or productivity (Kazaz et al., 2008). A study by Goodrum (2003) on construction craft workers revealed that work that gives sense of accomplishment was the greatest job preference that workers could have.

Many researches have been carried out regarding quality of work life since 1980 and results showed that there is positive correlation between quality of work life and some variables in organization such as job satisfaction. Some researchers considered QWL and job satisfaction as synonymous, however many of management science specialists and industrial psychologists believe that they are different in concept; QWL leads to job satisfaction (Jahanbani et al., 2017). Qualitative and quantitative studies express that most professionals agreed on factors such as working setting, communications between manager and colleagues,

methods of raise in position, pays and benefits as the major dimensions of job satisfaction (Hong Lu et al., 2007). Gupta & Sharma (2011) mentioned that quality of work life and job satisfaction shared similar dimensions such as adequate income and fair compensation, safe and healthy working conditions, opportunities to use and develop human capacity, opportunity for career growth, social integration into the work force, constitutionalism in work organisation, balance in work life and social relevance of work.

Studies on relationship of QWL and job satisfaction has been done for decades. In a study conducted by Herzberg et al. (1957), the outcomes indicate that there is a significant relationship between those two variables. However, there are some studies indicating low correlations. This is suspected to be caused by inaccurate measure of satisfaction and QWL practice. Quality of Work Life is intended to create satisfaction among personnel and assist organization in selecting and maintaining staffs (Jarrod & David, 2020). In short, quality of work life comes in handy in motivating and improving job satisfaction among employees (Royuela et al., 2009; Pavitra et al., 2019).

Research related in construction industry indicates research in QWL and job satisfaction is considered limited especially in Malaysia. One may find that a limited number of job satisfaction factor mentioned in the previous research, such as wage, job security and career development, may overlap with some of the dimensions of QWL (Shan et. al., 2016). Research in QWL also should tailored to particular demographics to make it more effective in keeping the construction workers' more satisfied thus leading to improved productivity, retention, and quality.

METHODOLOGY

A quantitative approach is used in this study to achieve the objectives: i) to identify the factors contributing towards quality of work life and ii) to determine the relationship between quality of work life and job satisfaction. Quantitative method is chosen as the mode of study as it is believed to produce a more precise and objective results as the data collected could be prevented against bias and alternative explanations. The method approach includes a questionnaire survey which enables the generalizability and replication of the result (Creswell, 2012).

The Questionnaire instrument used for this study comprised three sections, namely as follows; Section A - Demographical background, Section B - Quality of Work Life and Section C - Job satisfaction. Section B consists of QWL questionnaires which are adopted from the QWL evaluation model by Walton (1980). The questionnaire contains a total of 35 items in eight different dimensions of QWL. Walton's QWL model focuses on eight dimensions which covers basic aspects of the work situations, and are widely used instrument in the QWL evaluation The questionnaire contains a total of 35 items in eight different dimensions; fair and adequate compensation (4 items), working conditions (6 items), use of capacities at work (5 items), opportunities at work (4 items), social integration at work (4 items), constitutionalism (4 items), occupied space by work in life (3 items) and social relevance and importance of work (5 items). The Walton questionnaire was filled out by participants and they selected items related to their QWL on a 5-point Likert scale (Very Dissatisfied 1, Dissatisfied 2, Neither satisfied nor dissatisfied 3, Satisfied 4, Very Satisfied 5). In section C, Job Descriptive Index (JDI) questionnaire designed in 5-point Likert scale is

being applied as it is a popular method to indicate job satisfaction and it is proven to be highly reliable in previous researches. This questionnaire is adopted from Bowling Green State University (2009) which is a revised version of JDI designed by Smith, Kendall, & Hulin (1969). The JDI measure the facets of job satisfaction in the area of people on the respondents' present job (18 items), job in general (18 items), work on present job (18 items), pay (9 items), opportunities for promotion (9 items), and supervision (18 items). All Items designed to measure the construct were adopted from previous studies and refined through several human resource managers, then were reviewed by faculty members to assess face and content validity. Specifically, the development of a construct as based on the adoption of relevant research streams.

This study focusses on the employees of a PMC in Kuala Lumpur, Malaysia consisting both from the executive and non-executive lines. The total sampling population is 452. Krejcie and Morgan (1970) suggest a sample size of 208 respondents is adequate to represents the total populations, with 96 percent confidence and 5 percent margin of error. Questionnaire was randomly distributed to 250 employees which are players in construction industry with various professions including designers, engineers, geologists, clerk of work, environmentalists, and etc. The employees were chosen as the target population in this study because, based on the prep talk of the author with some of the employees, there are few factors that makes them feel dissatisfied with the organization, but they have no intention to seek for other jobs due to certain reasons. Therefore, this has drawn interest for the author to conduct a case study in this specific organisation.

This survey is conducted by distributing a total of 250 sets of questionnaires to the employees of a project management consultant in Kuala Lumpur, Malaysia; consisting from both executive and non-executive liners. However, the response received are only 116 which bring to a response rate of 46.4%. Table 1 summarized the socio–demographic of the respondents. Analysis shows that the male dominant the response rate which at 63 with 54.3%, while the female respondent at 53 with the percentage rate of 45.7%. The age of the respondents is divided into four categories which are the interval of 20 – 29 years old, 30 – 39 years old, 40 – 49 years old and lastly 50 – 59 years old. More than half of the respondents (55.2%) are in the age 20 – 29 years old which is 64 numbers of respondents. There is a fair of amount for respondents in between 40 – 49 years old and 50 – 59 years old which are 9 and 8 respectively. The other 35 numbers of respondents are of between 30 – 39 years old.

As for the academic qualification of the respondents, Bachelor's degree has domain at 70 numbers of respondents out of 116 and it seems like PhD only have a frequency of one. The data in table above showed that most of the respondents have been serving for the company in the range between 1 – 5 years at 52 numbers of frequency and dominant up to 44.8% of overall. Coming next, 15.5% conquer by the range of 6 – 10 years which is at 18 numbers of respondents.

Majority of the respondent are from the Executive position which is at 89 respondents (76.7%) from total respondents. The remaining 27 respondents (23.2%) are Non-executives. Similar to employment status, majority of the respondent are permanent staffs which is at 80 respondents (69%) from total respondents and the remaining 36 respondents (31%) are contract staffs.

Table 1. Socio – Respondents Demographic

Description		Frequency	Percentage
Gender	Male	63	54.3
	Female	53	45.7
Age	20 – 29	64	55.2
	30 – 39	35	30.2
	40 – 49	9	7.7
	50 – 59	8	6.9
Highest Academic Qualification	SPM	8	6.9
	Diploma	24	20.7
	Bachelor's Degree	70	60.3
	Master's Degree	13	11.2
	PhD	1	0.9
Years of Services in the Company	1 – 5	52	44.8
	6 – 10	18	15.5
	11 – 15	14	12.1
	16 – 20	12	10.3
	21 – 25	16	13.8
	26 and above	4	3.5
Position	Executive	89	76.7
	Non-executive	27	23.2
Employment status	Permanent staff	80	69
	Contract staff	36	31

In evaluating the possibility of non-response bias, a formal procedure was used to compare executive and non – executives group (Amstrong and Overton, 1977). Using a one-way analysis of variance procedure, no significant differences between groups were detected on any of the variables examined in this study. Thus, non-response bias was deemed to be of no significance in this research.

RESULTS

This section presents the results of the analysis and detailed descriptions about the statistical methods involved in the analysis.

Quality of Work Life and Job Satisfaction

Respondents were required to rate their level of satisfaction using the Likert's scale on how each dimension on Quality of Work Life is affecting them at their workplace. The result in Table 2 shows that all dimensions are evaluated averagely. The lowest mean is for fair and adequate compensation at 3.2026 (*S.D = 0.71923)*. According to the senior staffs, adjustments of the salary has been made only once in the last 10 years. This creates frustration and dissatisfaction when senior staffs compared their pay with newly joined staffs. Some claimed that the salary of new staffs is much better and higher compared to them who has been with the organization for quite some time. However, the company offers splendid extra benefits. The higher the position of a staff, the greater the amount of benefits received. Despite dissatisfaction on several factors in the job description, the lavishness of extra benefits is what makes the staff stays with the organization for years.

The highest mean is for social integration at 3.6832 (*S.D = 0.56564*). Based on the researcher's observation, the employees of the organization are multi-racial, and they get

along really well. They are very professional and does not mix up work and personal matters together. The company's values embrace teamwork and integrity in achieving success. They claimed that the values guide their actions and describe how they behave as a company and an individual.

Despite being analysed as the highest and lowest, both dimensions are still considered in the average level. In short, the Quality of Work Life programs implemented in this company is sufficient to satisfy the employees of the company, thus maintaining the staff retention rate.

Table 2. Analysis on dimensions of QWL

Dimensions	Mean	Std. Dev.
Fair & adequate compensation	3.2026	.71923
Working conditions	3.5417	.59258
Use of capacities at work	3.4216	.54594
Opportunities at work	3.2306	.61428
Social integration at work	3.6832	.56564
Constitutionalism	3.4087	.58050
Occupied space by work in life	3.4319	.84232
Social relevance & importance of work	3.5200	.53887

In Section C of the questionnaire, the respondents were required to rate their level of agreement using the Likert's scale on how each option in the dimensions of job satisfaction is related to them at their workplace. This section is divided into six main sections; people on present job, job in general, work on present job, pay, opportunities for promotion and supervision. Table 3 indicates the mean value for each dimension of job satisfaction. The result shows the mean for every dimension does not differ much. The lowest mean is for opportunities for promotion at 2.8164 *(S.D = 0.53839*) and the highest mean is for people on present job at 3.5573 *(S.D = 0.54546)*.

Table 3. Analysis on dimensions of job satisfaction

Dimensions	Mean	Std. Dev
People on your present job	3.5573	.54546
Job in general	3.5551	.52036
Work on present job	3.3902	.48048
Pay	3.0168	.69231
Opportunities for promotion	2.8164	.53839
Supervision	3.3505	.48671

According to the staffs, it is very difficult to be promoted as there are very limited quota for promotions that has been set up by the management. The chances are small as there are staffs that has been working for more than 7 years but has not been promoted even once. As for the "people on present job", this can be seen in their working environment where the employees are very helpful; senior staffs are not hesitant to provide new staffs with guidance. Mentoring and buddy system are being practice in this company so that no staff would be too burdened by the workloads. They would work together in achieving the company's objectives.

Next, a Pearson's correlation was carried out to determine the relationship between Quality of Work Life and job satisfaction. The correlation between two variables is measured by correlation coefficients. A positive coefficient indicates a positive relationship between two variables, and a negative coefficient indicates a negative relationship. Coefficients close to ∓ 1 indicate a strong relationship, and 0 indicates no relationship.

Table 4 shows the detail analysis between QWL dimensions and job satisfaction dimensions. Results shows that there is positive relationship that exist between all the dimensions of QWL. Majority of the correlation; slightly more than half; falls in the "low correlation; definite but small relationship" category and around 35% make up the "moderate correlation; substantial relationship" category. None falls in the high or very high correlation category.

Table 4. Correlation test on QWL and job satisfaction

Dimensions of QWL	People	Job in general	Work	Pay	Promotion	Supervision
Fair & Adequate Compensation	.008	.041	.151	.492**	.204*	.245*
Working Conditions	.388**	.303**	.380**	.390**	.199*	.342**
Use of Capacities at Work	.476**	.522**	.642**	.283**	.466**	.596**
Opportunities at Work	.368**	.344**	.474**	.345**	.529**	.485**
Social Integration at Work	.599**	.366**	.515**	.196*	.281**	.469**
Constitutionalism	.418**	.325**	.416**	.395**	.463**	.477**
Occupied Space by Work in Life	.307**	.213*	.362**	.264**	.180	.291**
Social Relevance & Importance of Work	.363**	.383**	.414**	.266**	.380**	.355**

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*

"Use of Capacities at Work" and "Work at Present Job" have marked the highest relationship (r = 0.642) in the moderately correlated category. The higher the level of importance of the given task to them the higher the satisfaction of the work. This is because with the opportunity to make decisions, appropriate amount of responsibilities and fair performance evaluation, employees would be satisfied with their work on present job. This is followed by "Social Integration at Work" and "People on Your Present Job" (r = 0.599), where the relationship, respect, and commitment between colleagues will affect the satisfaction on people in the present job. "Social Integration at Work" also has a positive association with "Work at Present Job". These finding is similar with the studies conducted by Raziq and Maulabakhsh (2015) showed a positive relationship between the working environment and job satisfaction and Goehringa et al. (2005) that state poor job resources and conditions resulted in discouraging working environments and weak communication among the staff. Baumann (2007) state, for an ideal working environment, organization should have work-related well-being, security and wellness policies that deal effectively with dangers at the workplace, and with favouritism, physical and mental torture, risks related to individual security and occupational pressure. More precisely, an ideal working environment provides job safety and security, attractive pay, and open communication and transparency, thereby promoting equal opportunities for professional growth. Thus, by giving employee the experience of good working conditions, enjoyed good relationships with peers and senior at work, and who felt being part of the organization structure, tend to have a higher level of job satisfaction.

CONCLUSION

Quality of Work Life and Job Satisfaction has been among the extensive subject of research for decades and significant progress in line with academic and industrial perspectives of the subject has been attained over this period. However, very limited study has been made regarding this subject for project management consultancies. The aim of this study is to examine the state of eight dimensions of QWL in an organization and the way they affect job satisfaction among employees.

The first objective is managed to attain by the results from the questionnaire distributed. From the software analysis, mean for every dimensions of job satisfaction are generated. Looking at the results, the score for every dimension can be considered as average; with the highest mean for "People on Present Job" and the lowest mean for "Opportunities for Promotion". Using the same mechanism for the second objective, the results are mostly average too for all the dimensions of QWL tested. The highest mean for "Social Integration at Work" and the lowest for "Fair and Adequate Compensation". Therefore, it could be deduced that the social setting in this organization is excellent and satisfying.

The final objective for this study is to determine the relationship between QWL and job satisfaction. Based on the Pearson's correlation test run using the statistical software, there is a positive significant relationship between most dimension of QWL and job satisfaction. The results revealed that "Use of Capacities at Work", "Opportunities at Work", "Constitutionalism" and "Social Relevance and Importance of Work" are correlated to all the job satisfaction's dimensions. It is also observed that "Use of Capacities at Work" and "Work at Present Job" have marked the highest relationship ($r = 0.642$). Therefore, these areas are the ones that employers of this organization need to focus on if they were to enhance the level of satisfaction of their employees.

Several limitations of the survey and the collected data need to be considered when analysing and interpreting the results. Firstly, the given answers by the participants are self-reported, which cannot be objectively observed by an external assessor who collects the data. Therefore, certain subjectivity needs to be taken into account by interpreting the data. Secondly, not all items of the questionnaire are yet to be validated in all countries, which could lead to distorted interpretations of the data as they are not specially designed for Malaysia employees. The study used only survey questionnaires to investigate the QWL and job satisfaction. Although Walton's model and JDI are valid and reliable, all aspects of these variables cannot be fully proven by only using the questionnaire survey. Hence, qualitative or mixed modes studies should be conducted for better and firm results.

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CONTRACTUAL BEHAVIOUR IN CIVIL ENGINEERING PROJECTS: DELAY OF CONTRACTOR'S WORK PROGRESS

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Abstract
This paper describes the importance of paying attention on aspects of delay of contractor's work progress in dealing with delays in civil engineering project construction. The purpose of this paper is to assess those factors contributing to the delay of contractor's work progress and to provide recommendation on how to overcome or mitigate effect of the problem. The research data were gathered via responses from questionnaire survey and semi-structured interviews with Grade G7 contractors and professional engineers involved in civil engineering projects. This research concluded that a firm project definition/scope and a comprehensive design are very important to be well developed before the construction starts since the result shows that factor of project scope changes, ground uncertainty, surrounding uncertainty contribute significant influence on delay of contractor work progress. Similarly, concerns must be put during site and soil investigation at the onset to reduce the impact of unpredictable ground condition. These three significant factors likely to cause variation works and may distrupt the progress of works. Likewise, resources availability and competency of contractor were significant as well in causing the delay. The initiatives recommended in this study which outline eleven (11) actions that need to be taken by the contractor, the engineer (consultant team) and the client is hoped could improve the contractual behaviour of the contractor in delivering a good performance of civil engineering projects in Malaysia.

Keywords: *Civil engineering; delay; standard form of contract; work progress.*

INTRODUCTION

In Malaysia like other countries, civil engineering structures such as roads, highways, dams, bridges, airports and ports offer a significant contribution towards developing the nation by generating economics activities and attracting local and foreign investments. Unfortunately, many civil engineering projects are plagued with problems of time overrun in project delivery (Karunakaran et al. 2019). Apart from a long list of problematic projects in Malaysia, Bakun Dam (The Star, 2010) and Double Track Railway (Bernama, 2005) are the classic example of the civil engineering projects that experienced delay in their project's delivery. Instead of turning into a vibrant commercial enterprise generating 2,400 megawatts (MW) of electricity and increasing the efficiency of the land transportation network, these projects suffered delay in construction and temporary abandonment which resulted considerable hiking up of their total development cost. These unsatisfactory performance impact not only at project level, but reduce employment opportunities, slow down economic activities, loss of government revenue and deterrence of foreign investment in the Malaysian economy.

Nevertheless, the unsatisfactory civil engineering project performance not only experienced in Malaysia but elsewhere around the globe. In Korea, the study by Lee (2008) reported that 161numbers of civil engineering projects consist of roads, railways, ports and

airports have experienced cost overruns in their implementations. In the meantime, Lo et al. (2006) reveal that civil engineering project delays and cost overruns in Hong Kong are not uncommon where the authors reported that only 35% of civil engineering projects completed within schedule while the rest 75% faced problems of performance. Likewise in Tanzania, more than 70% road projects faced escalation of time with a magnitude more than 50% (Simon, 2017). Meanwhile in Saudi Arabia, Ikediashi et al. (2014) mention that despite massive development of infrastructure spent by the government, unfortunately most of the projects faced the problems of under-budgeting, cost and time overruns, inadequate and improper scope and not meeting the users' requirement. In India, National Highway Development Projects (NHDP) reported that as on March 2010, out of 224 projects, 168 projects underwent cost overruns, 148 projects faced schedule delay and 20 projects were subjected to both time and cost overruns (Venkateswaran & Murugasan, 2017).

This situation resulted the client, the stakeholders as well as the industry suffered financial loss, time waste and poor quality of end product and in the extreme, may lead to total project abandonment (Sambasivan & Soon 2007; Shehu et al., 2014; Ikediashi et al., 2014). In addition, the delays also may lead to a negative rate of national economic growth (Shehu et al., 2014) due to delay in generating economic activities and loss of investment opportunity. Hence, it is important for the government to place more concern on the time performance of civil engineering projects in order to maintain the public trust, fulfil policy aims and to deliver facilities as promised to the citizenry.

In reviewing literature on the aspects of time overruns in construction projects, prevalently can be found that most of the factors that mainly lead to the construction project time overruns is the delay in the contractor's work progress (Jaffar et al., 2011; Sambasivan & Soon, 2007; Alaghbari et al., 2007; Lo et al., 2006). Hence, this study focused on the delay of work progress in civil engineering projects and to what extent it impacts the project performance. The first objective of this study is to evaluate the level of occurrence of delay of contractor's work progress in civil engineering projects in Malaysia. The second objective is to determine the significant factors influencing the occurrence of delay of contractor's work progress. This entails establishing the importance levels of such factors in influencing delay of contractor's work progress. The third objective is to recommend initiatives to be considered by project participants to overcome delay of contractor's work progress.

LITERATURE REVIEW

The progress of contractor's works on site whether ahead or delay is determined by comparing with the work program prepared by the contractors before the commencement of work on site with the actual work progress on site. Othman (2009) stated that in construction process, a program is usually produced to record the sequence of work which is called work program. The purpose of the work program is to assist the contracting parties as well as the project key participants to plan and manage the construction process. After entering into the contract, the contractor is required to submit a work program detailing every sequence of construction work including the time allocated for the works to the engineer for approval. Once the work program has been approved by the engineer that approved work program will be referred to for monitoring and coordinating the construction work on site. For any types of construction projects, the progress of the construction process on site is very critical to be

closely followed according to the approved work program to avoid the occurrence of any delay.

Unfortunately, the work program is not usually listed as a contract document where most standard forms of contract do not state it to be part of the contract document. Therefore, it is not considered binding on the parties and it becomes an indicative tool for the contracting parties, suppliers and consultants for administering the progress of the works. In fact, in PWD 203A, the express obligation of work program requirement is silent and not included in the list of contract documents. Thus, it implies that it does not add to the contractor's obligations. In contrast, the FIDIC standard form of contract (Red and Yellow Books) clearly stated that the contractor is required to submit a detailed work program to the engineer for approval within 28 days after the commencement date. Not only the work program, but the supplementary report also detailing the methods of construction to be adopted and details of personnel and equipment required on site for each of construction stage. Thus, this can be concluded that, the approved work program in the PWD203A does not become a part of the contract. Meanwhile, under FIDIC (Red and Yellow Book), the status of work program is ambiguous and it is quite unfair to the contractor if in case of failure by the contractor to comply with the approved work program, it entitles the employer to terminate the contract (Hardjomuljadi, 2015). This is due to, most approved work program subjected to change in the future to suit the construction condition on site.

Regardless of whether it is a part of a contract or not, the approved work program is a very important tool that ensures the construction works on site are on track. This is based on the fact that the contract requires the contractor to proceed regularly and diligently with the performance of his obligations under the contract. Hence, the construction activities that duly obey the sequence and time allocated in the approved work program is very critical and lead to the successful of construction project. Therefore, frequency of delay of contractor's work progress on civil engineering project is important to be researched and significant factors influencing it is critical to be determined. The current research seeks to explore, analyse, and document these factors in the specific context of the civil engineering projects in Malaysia, where if properly understood, can help projects to complete on time. This study also provides industry-specific recommendations for improvement to be considered by project key participants during project implementation.

METHODOLOGY

A questionnaire was designed based upon literature containing twenty-seven factors from four domains namely project characteristics, the quality of Standard Form of Contract (SFoC), external factors and attitudes of project key participants that contributing to delay of contractor's work progress in civil engineering projects. To fit into the Malaysian civil engineering construction conditions, the preliminary questionnaire was pilot tested. Four experienced construction practitioners were involved in the pilot test include a road engineer in the Public Work Department, two contractors, and a resident engineer. Based on the feedback received, amendment was made which includes amendment to the wording and discarding unnecessary questions or variables.

The questionnaire consisted of two sections: the first section requested characteristics of the respondents while the second focused on the factors causing delay of contractor's work

progress. These factors were measured by using a series of Likert scale to measure responses on a scale of 1-5 inclusive. The twenty-seven factors were randomly arranged and presented for assessment in this way to determine which of them has the highest influence on delay of contractor's work progress. Next, questionnaire was distributed to Grade G7 contractors hereinafter referred to as "the contractor") and professional civil engineer (hereinafter referred to as "the engineer") involved in civil engineering projects. Several means were employed to distribute the questionnaires to potential respondents such as via postage, email and by hand (face-to-face). Responses to the questionnaire were then collected and analyzed. Descriptive analysis was used to rank the factors in terms of level of influence. A Mann-Whitney U test was carried out to ascertain if there exists any statistical variation between the mean values computed between engineers and contractors' perception. Cronbach alpha value was calculated in order to check the internal reliability of the factors included in the questionnaire. The Cronbach alpha value was 0.802 which indicates acceptable reliability. Therefore, the result of the reliability test verifies that all variables in the study demonstrate internal consistency. This study ranked the mean values based on criticality of factors that causing the occurrence of delay of contractor's work progress as perceived by engineer and contractor. The factors with mean values between 4 and 5 are considered to have high significance to causing time overrun.

In addition to the questionnaire surveys, 28 semi-structured interviews were also conducted with the respondents who had responded to the questionnaires. This was done to gather their opinion on initiatives to be taken to overcome delay of contractor's work progress in civil engineering construction projects. The interviews were audio taped and on the average took 30 minutes. The interview data was transcribed and examined using content analysis. This involved manually aggregating themes and categories from the interview transcripts.

RESULT AND DISCUSSION

Respondent's demographic

Out of total 1200 questionnaires distributed, 288 were collected back that yielded a response rate of 24 percent comprising of 137 engineers (48%) and 151 contractors (52%). These almost equal number of two group respondents could eliminate biasness in the results of the survey. As shown in Table 1.0, majority of respondent representing engineer organisation were civil engineers (88%) and the remaining 12% were managers. Meanwhile, majority of respondents representing contractor organisation was quantity surveyors, followed by civil engineers and managers. This implies that all respondents' posts were at executive level and above suggesting that the data gathered in this study were come from reliable sources because the respondents play important roles in the project execution. Moreover, majority of respondents participated in the survey have wide experience managing and constructing civil engineering where 45% of engineer respondents and 36% of contractor respondents have experience more than 10 years. While 49% of engineer respondents and 46% of contractor respondents have experience between 6 to 10 years. Only 6% of engineer respondents and 18% of contractor respondents have experience between 2 to 5 years. In terms of the type of civil engineering projects, majority of them (90%) have experience managing and constructing road or highway projects. It is followed by bridges (35%), airports (19%), railways (14%), drainage or canals (13%), tunnels (9%), dams (6%) and ports (5%).

Table 1. Demographic background of respondents

Types of Respondents	**Frequency**	**Percentage (%)**
Engineer	137	48
Contractor	151	52
Total	288	100

Respondents position in their organisation	Engineer		Contractor	
	Frequency	(%)	Frequency	(%)
Manager	17	12	19	13
Civil Engineer	120	88	20	13
Quantity Surveyor	0	0	112	74
Total	137	100	151	100

Year of experience in civil engineering projects	Engineer		Contractor	
	Frequency	(%)	Frequency	(%)
Less than 2 years	0	0	0	0
2 to 5 years	8	6	28	18
6 to 10 years	67	49	69	46
More than 10 years	62	45	54	36
Total	137	100	151	100

Types of Civil Engineering project	Frequency	Percentage (%)
Road/Highway	259	90
Railway	39	14
Bridge	101	35
Drainage/Canal	36	13
Tunnel	26	9
Port	14	5
Airport	56	19
Dams	17	6

Occurrence level of delay of contractor's work progress in civil engineering projects in Malaysia

A five-point Likert scale was used to determine the level of occurrence of delay of contractor's work progress in civil engineering projects with values on the scale as follows: 1 as "very low", 2 as "low", 3 as "moderate", 4 as "high" and 5 as "very high" occurrence. Hence, factors with mean scores between 4.00 and 5.00 are considered as having high frequent occurrence (Shehu et al., 2014; Adedokun et al., 2013; Nguyen et al., 2004). Meanwhile, for the factors with mean values from 3.00 to 3.99 are considered as having moderate occurrence. While for the factors with mean values less than 3.00 are considered as low occurrence. As depicted in Table 2, the mean score for overall respondents was 3.78 which indicates that the occurrence level at moderate- to-high occurrence. However, based on the Mann-Whitney U result, there was a significant difference (p-value = 0.000) of frequency of occurrence rated by them where the engineer respondents rated the occurrence of delay of contractor's work progress was higher (M=3.89) than contractor respondents (M=3.68).

Table 2. Delay of contractor's work progress in civil engineering projects

Delay of contractor's work progress	**Overall**	**Engineer**	**Contractor**	**Mann- Whitney U *Sig. p***
Mean Score	3.78	3.89	3.68	0.000*

Significant factors contributing to delay of contractor's work progress.

Similar five-point Likert scale (1 as "very low", 2 as "low", 3 as "moderate", 4 as "high" and 5 as "very high" influence) was used to determine the significant level of the twenty-seven factors in influencing delay of contractor's work progress in civil engineering projects.

Table 3. The ranking of factors that influenced delay of contractor's work progress

Factors influencing delay of Contractor's work progress	Overall		Engineer		Contractor		Mann- Whitney U *Sig. p*
	Mean	Rank	Mean	Rank	Mean	Rank	
Resources availability	4.58	1	4.58	1	4.58	1	0.894
Project scope changes	4.45	2	4.45	2	4.46	2	0.842
Ground uncertainty	4.34	3	4.30	3	4.38	3	0.199
Surrounding uncertainty	4.33	4	4.30	4	4.36	4	0.290
Competency of contractor	4.04	5	4.07	5	4.01	5	0.032*
Project complexity	3.91	6	3.85	10	3.97	6	0.001*
Bureaucracy of government agencies	3.91	7	3.96	8	3.87	8	0.078
Adequacy of details and specifications	3.88	8	3.99	6	3.78	10	0.001*
Changes in government regulations and laws	3.87	9	3.87	9	3.87	7	0.908
Weather condition	3.87	10	3.96	7	3.79	9	0.000*
Changes in initial design	3.77	11	3.80	11	3.74	11	0.204
Cooperation in solving problems	3.75	12	3.77	12	3.74	12	0.412
Familiarity of procurement method used	3.4	13	3.50	13	3.32	13	0.003*
Poor in following condition of contract	3.31	14	3.46	14	3.18	15	0.000*
Site access	3.26	15	3.28	15	3.25	14	0.560
Tight project milestone	3.21	16	3.26	16	3.16	17	0.054
Project size	3.16	17	3.15	19	3.17	16	0.632
Level of understanding condition of contract	3.16	18	3.26	17	3.07	18	0.000*
Completeness of SFoC	3.05	19	3.17	18	2.93	19	0.000*
Technological advancement	2.85	20	2.99	20	2.72	21	0.000*
Multicultural team	2.76	21	2.73	22	2.79	20	0.197
Fairness of SFoC	2.66	22	2.90	21	2.45	22	0.000*
Procurement method	2.52	23	2.66	23	2.40	23	0.000*
Trust produced by SFoC	2.36	24	2.39	26	2.34	24	0.321
Project type	2.35	25	2.43	24	2.28	25	0.014*
Type of SFoC	2.31	26	2.41	25	2.21	26	0.000*
Clarity of SFoC	2.23	27	2.29	27	2.17	27	0.028*

According to the overall mean value ranking depicted in Table 3: (1) *resources availability* (4.58), (2) *project scope changes* (4.45), (3) *ground uncertainty* (4.34), (4) *surrounding uncertainty* (4.33) and (5) *competency of contractor* (4.04) are the five significant factors that contribute to delay of contractor's work progress based on assessment of both contractors and engineer. The Mann-Whitney U result which more than 0.05 p-value also indicates consensus by both types of respondents have consensus that aforementioned factors were significantly influence delay of contractor's work progress except for *competency of contractor* factor.

The availability of resources such as materials, labours and machineries throughout project duration is critical to ensure the construction activities could be carried out in accordance with the approved work programme. In fact, it is unarguable that on-site activities and productivity can be affected by the availability of materials, labours and machineries needed for construction activities (Alzahrani & Emsley, 2013). This finding is in accordance with the study by Aziz & Abdel-Hakam (2016) who found that problems in resources availability gave severe impact on road projects in Egypt where the shortage in equipment was ranked second and shortage in construction material was ranked fourth on the list of

factors causing delay. The level of availability of resources also has been reported in scholars as having great impacts on the project time performance (Dao et al., 2017; Memon et al., 2011; Toor & Ogunlana, 2009; Sambasivan & Soon, 2007).

On the other hand, problem in resources availability could interrupt the smoothness of construction activities and can cause demotivation among workers as well as key project participants. This is in line with a report by Ng et al. (2004) that the severe problems in resources availability could demotivate workers as well as other key participants to work hard to achieve project goals. As a result, the project participants who are inadequately motivated tend to make only a minimal effort, therefore reducing overall productivity potential. The finding from this study confirms that the problems in resources availability would greatly contribute to delay of contractor's work progress. Thus, this issue must be taken seriously by not merely contractor and their subcontractors but all participants in projects. Unfortunately, to some extent, the resources availability is out of the project's key participants control because occasionally there is an intervention from government as well as the current political and economic conditions.

Project scope changes was ranked by respondents as the second significant factors causing delay in contractor's work progress. Although the occurrence of project scope changes is not frequent in civil engineering projects, the impacts of the changes would give severe impact on the contractor's activities on site. To some extent, the changes of project scope would be the significant reason for original contract changes (Verweij et al., 2015). Although the project scope changes made by the client will entitle the contractor for Extension of Time (EOT), but more or less, it does impact the contractor's planning and resources. In fact, the contractor's staffs as well as subcontractors original planning will also be disrupted. Mostly, the decision on the scope of projects by client is made based on the information available to them at the onset of the project initiation. Unfortunately, civil engineering projects are inherently complex and full of uncertainties causing that the contract and the scope of the project cannot foresee all eventualities in its implementation. Thus, the changes of project scope will occur in line with any unforeseen eventualities throughout project implementation. As a result, the changes in project scope make the original approved work programme not valid anymore. Besides, all the earlier preparation of the contractors for the project made up of the workers, materials, machineries as well as the original arrangement with suppliers and subcontractors might be affected. Other than that, the project scope changes might also become a risk factor causing project cost underestimation (Moret & Einstein, 2016). Hence, all of these impacts of changes in original project scope would severely cause delay in contractor's work progress.

Ground uncertainty and *site surrounding uncertainty* were ranked by respondents as the third and the fourth significant factors causing delay in contractor's work progress. Civil engineering projects which cover large geographical area such as roads, railways, tunnels, bridges and ports experience unpredictable ground condition. Hence, a precise and adequate site and soil investigation (SI) is critical for design development. Unfortunately, due to the site of the project covering a very large geographical area, the numbers of SI might deliberately limit due to cost and time constrains. This risky approach made by the client could lead to problems during construction stage if the developed design is not suitable with the real ground condition on site. This indeed true where Aziz & Abdel-Hakam (2016) found that among critical factors causing delay of roads project in Egypt was inadequate

geotechnical investigations. In fact, Cheung et al. (2008) stated that the inadequacy of SI in most construction projects not only creates problems of design and buildability, but also triggers conflict and disputes among the project participants. Needless to say, if the dispute occurs, the delay of contractor's work progress could be more severe. Besides, site surrounding uncertainty which include the people surrounding the site, the access to site as well any accidents or death of worker or people which relate to the activities on construction site also could interrupt the contractor's work on site. Although these incidents rarely occur, site surrounding problems including the objections from people towards the project or blockade of site access by surrounding people will result in the construction activities on site unable to proceed.

Lack of *contractor competency* in carrying out construction of civil engineering project were agreed by respondents in this current study could contribute significantly to the delay of Contractor's work progress on site. This is in tandem with many previous scholars who determined the factors causing delay in variety types of construction projects, as they found that the failure to implement the construction works in a competent manner is among the critical factors causing delay such as Lo et al. (2006); Shehu et al. (2014); Aziz & Abdel-Hakam (2016) and Riazi & Nawi (2018). Inexperienced contractor carrying out works awarded to them is an example of incompetency. Civil engineering project is a type of project requires a wide experience contractor to build because most of the projects are very complicated in design and include method of construction which involve high technology and large machineries. Mainly, inexperienced contractors choose improper construction method where it would eventually lead to many other problems such as unsafe construction, damage to surrounded property as well as rework because of errors during construction. Hence, inexperienced contractor could slow the project implementation and lead to questionable construction quality if the construction process is not closely monitored by the engineer. Other than that, the incompetency of contractor in terms of poor site management and supervision, poor coordination with the parties involved in the project and poor of financial management of the project also highly contribute to delay of contractor's work progress. According to Cheung et al. (2008), the incompetency of contractor in constructing a construction project mostly reported causing conflict among the project participants. Therefore, a thorough process of contractor selection is a must to ensure the project can be delivered successfully.

Initiatives to overcome delay of contractor's work progress.

A total of 28 semi-structured interviews were conducted to gather opinion on initiatives to be taken to overcome delay of contractor's work progress in civil engineering construction projects. The participants of the interviews were shown in Table 4. Based on Table 4, 57% of respondent represent contractors, while another 43% represent engineers. Majority of them have experience more than 10 years in civil engineering projects. For both engineers and contractor interviewees, all of them are the person at executive level who directly involved in the project planning, implementation and controls.

Table 4. Organisation of interviewees

Types of Respondents	Frequency	Percentage (%)
Engineer	12	43
Contractor	16	57
Total	28	100

Year of experience in civil engineering projects	Engineer		Contractor	
	Frequency	(%)	Frequency	(%)
Less than 2 years	0	0	0	0
2 to 5 years	1	8	3	19
6 to 10 years	3	25	7	44
More than 10 years	8	67	6	37
Total	12	100	16	100

There were eleven (11) initiatives recommended to be taken by project participants where six (6) of them require actions by the contractor, three (3) by the engineer, two (2) by the client as shows in Figure 1.

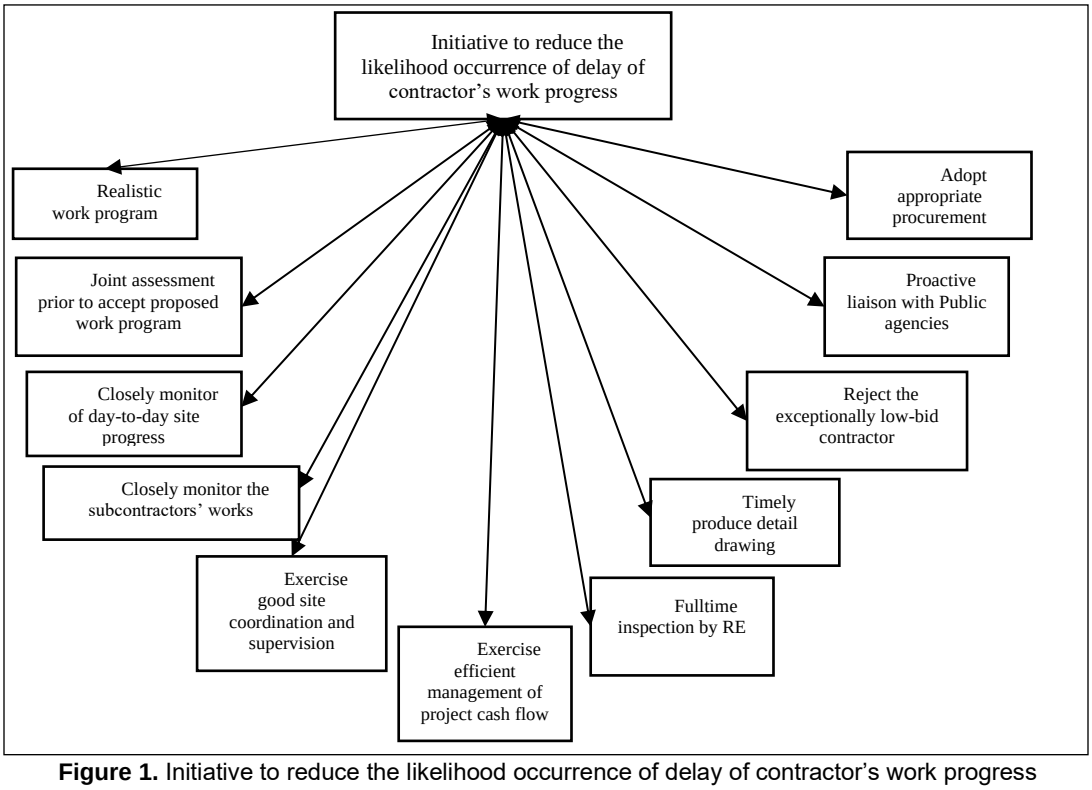

Figure 1. Initiative to reduce the likelihood occurrence of delay of contractor's work progress

The initiatives recommended to be taken by contractor were to *closely monitor of day-to-day site progress, closely monitor the subcontractors' works, exercise good site coordination and supervision, exercise efficient management of project cash flow, allocate a contingency budget* and *proactive liaison with public agencies.* The contractor with due diligent must ensure that the progress on site is on track as planned in the approve work program. Hence, he via his personnel on site must closely monitor the day-to-day site progress by recording all the works, materials inventory and taking photographs. This is important to track the progress of works on site to be in lined with the work program. Besides, the subcontractor's work and progress also must be closely monitored. All of this could be done by monitoring their works

on site as well as by holding a regular site meeting with all subcontractors. Hence, a good site coordination and supervision from the contractor is important to smoothen the construction activities by all subcontractors.

Insufficient fund by contractor is seen as a major factor causing project implementation interruption, hence an efficient management of project cash flow by the contractor is vital to avoid any delay in work progress. Undeniably, delay of interim payment made by client may interrupt the project cash flow. More importantly however, the contractor must exercise efficient management of project cashflow by spending money strictly based on the planned and projected budget at the onset of the project and not to use the project fund for other things especially if the contractor is carrying out more than one construction projects at one time. Allocating a contingency budget for the project also is viewed as a practical initiative by the contractor to avoid shortage of fund during project implementation. In the event there is delay of payment by the client, this contingency budget may be useful for the contractor to proceed the construction works without any interruption. The contractor may allocate 5% to 10% of the total construction cost contingency budget which are held in reserve to deal with any unforeseen events such as unpredictable ground condition, unexpected cost arise throughout the construction process or delay of interim payment by the client. Hence, delay of contractor's work progress due to insufficient fund could be avoided.

The progress of construction works also might be interrupted due to problems with the material availability, shortage of labour as well as plants and machineries. Hence, it is recommended that the contractor to exercise an efficient planning, executing and controlling adequate materials and plants and good labour surveillance. The contractor must accurately estimate, allocate and optimally utilised resources for the construction activities. Furthermore, with an effective management of materials procurement schedule and provision for relevant contractual arrangement among the suppliers would help to control the issues of material price escalation. Likewise, the availability of labour to carryout construction works as well as their productivity also important to be monitored and assessed regularly. Hence, via proactive planning and good development of management competencies, the delay of contractor's work progress can be avoided.

The initiatives recommended to be taken by engineer were *fulltime inspection by resident engineer (RE), timely produce the revised drawing, joint assessment prior to the acceptance of contractor proposed work program.* The construction of civil engineering projects especially that cover very large geographical area require a close supervision from consultant on the planning, coordination and implementation of construction works on site by the contractor. Hence, a fulltime inspection and supervision by RE on contractor works is important to ensure a good progress of works on site. Aside from issuing instructions to the contractor and reporting regularly to the designer and/or client, RE is a very important person as a reference by the contractor for clarification of any ambiguity or problems occur on site.

The revision of the original drawings or details usually cannot be avoided in civil engineering projects due to their complexity and uncertainty. Hence, a timely produced the revised drawings by the engineer may avoid delay of construction progress. This could be done by giving priority to timely produce drawings in parallel with the stage of works currently carried out by the contractor on site. As a result, the progress of contractors' works will not be interrupted. A realistic, practical and workable work program is very important

and thus it must be properly prepared by the contractor at the initial stage. A failure to come out with a workable workprogram is interrelated with lack of systematic management on site and inadequacy of contractor's experience. Hence, joint assessment prior to the acceptance of contractor proposed work program by all key participants is very important. The assessment must be done not only based on experience and intuitive judgement but must take into account the weather conditions, political situations and also the introduction of new technology that may appropriate for the project. Hence, a well-planned project could be well executed.

The initiatives recommended to be taken by client were to *reject the exceptionally low-bid contractor* and *adopt appropriate procurement method that less adversarial relationship in project implementation.* Owing to intense competition and bidding, some contractors are not capable to complete the projects that have been awarded to them because of unreasonably low bidding prices. Hence, the client must reject the exceptionally low-bid contractor during the tender evaluation and analysis in order to avoid problems of shortage of fund and poor quality of work done by the contractor once the project started the construction works. It is better for the client to pay little extra to choose a competence and experience contractor rather than taking risk by choosing an exceptionally low-bid contractor. The right choice of procurement method used for civil engineering project also important to ensure smooth progress of construction works. Since the civil engineering projects involve with uncertainty in many aspects of its implementation, the use of procurement method (other than traditional method) which less adversarial relationship and encourage cooperation among the project key participants is recommended such as design-and-build, turnkey, construction management, management contracting and partnering method.

CONCLUSION

Civil engineering projects require major investment outlays in most developing countries like Malaysia, yet most construction projects in this country are characterized with unsatisfactory performance in terms of quality, time and cost overruns as well as conflict among the project participants. One of the contributing factors to the unsatisfactory performance replete in literature is delay of contractor's work progress and the finding of this study support the literature statement where the result shows that the level of occurrence of delay of contractor's work progress was moderate-to-high. Hence, this matter must be placed more concern by all industry players. On top of that, a firm project definition and scope and a comprehensive design are very important to be well developed before the construction starts since the result shows that factor of project scope changes, ground uncertainty, surrounding uncertainty contribute significant influence on delay of contractor work progress. Similarly, concerns must be put during site and soil investigation at the onset to reduce the impact of unpredictable ground condition. These two significant factors likely to cause variation works and may distrupt the progress of works. Likewise, resources availability factor was significant as well in causing the delay and must be put more concern to eliminate the delay. The initiatives recommended in this study which outline eleven (11) actions that need to be taken by the contractor, the engineer (consultant team) and the client is hoped could improve the contractual behaviour of the contractor to deliver a good performance of civil engineering projects in Malaysia.

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STRATEGIES TOWARDS A SUCCESSFUL CLAIM MANAGEMENT IN CONSTRUCTION PROJECTS

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Abstract
Construction contracts are rarely perfect and claims for time extensions and additional costs often have to be made by one party on another. The extensively increasing number of construction claims indicates the need for the implementation of an effective construction claim management. This paper aims to identify the rationale behind the claim management in the Malaysian construction industry. Triangulation methodology was used whereby both quantitative and qualitative methodology which involved questionnaires and interviews from both the contractors' and quantity surveyor consultants' point of view. To complete the triangulation approach, expert group validation was conducted to validate the findings from the research (through quantitative and qualitative methods). The findings highlight on the three (3) critical claim stages that need to be focused by the construction industry practitioners. There are claim identification, claim notification and claim documentation. The need for a good documentation and record keeping system with a competent site staff that can recognize a claim during project execution is very critical. Keeping appropriate project information is an essential part of project monitoring and reporting. It also appears that a standard and transparent procedure should be put in place whereby contractors would be able to follow in order to properly prepare the claim. In addition, staff awareness, training in how to document and submit a well-supported claim, and negotiations with clients are becoming a necessity. The strategies towards achieving a successful claim have been identified as being comprised of elements that are essential for inclusion in claims and the initiatives to be taken by the construction industry practitioners to reduce the likelihood of failure of such claims.

Keywords: *Research methodology; claim management; construction.*

INTRODUCTION

The construction sector is one of the main economic engine sectors supporting the Malaysian economy. The expansion of this sector has led to the revival of the construction profession, and the promotion and encouragement of new investments. The sector has played a crucial role in extending job opportunities for the Malaysian labour force. It is central as being the catalyst for development and a major indicator and determinant of domestic performance in the economy. The Malaysian construction industry has strong relationship with the country's Gross Domestic Product (GDP) (Abdul-Malak et al., 2002). The relationship thus indicates that construction activities in Malaysia are strongly dependent on the level and characteristic of the country's economy.

Malaysia has set its vision to be a fully developed nation by 2020. The practice of efficient and timely payment of claim in construction projects is a major factor that can contribute to a project's success. A smooth cash flow brings an effective delivery, on time and within budget so that projects can be completed within the planned time and with acceptance of quality (CIOB, 2004).

Claim issues in the construction industry are considered a factor of significant concern to all the players in the industry. A survey of the claim performance has shown that construction industry, in particular, is prone to late-payment culture (Johnston, 1999). Furthermore, in Malaysia, local practice is doubtful in the process of claiming and assessing the extension of time and there is no standardized procedure or protocol for both contractors and clients (Ho and Liu, 2004).

Construction claims are considered by many project participants to be one of the most troublesome and unpleasant events of a project (Lew et al., 2012). The high competition coupled with the sluggish global economy has forced contractors to bid projects with minimum profits in order to stay in business. In addition to their multiparty nature, projects are becoming more complex and riskier. This has placed an added burden on contractors to construct increasingly sophisticated and risky projects with less resources and profits. Under these circumstances, it is not surprising that the number of claims within the construction industry continues to increase (Zaneldin, 2005).

Construction claims have such high impact on construction project's cost and time that an effective claim management system in any construction organisation deserves serious attention (Chovichien and Tochaiwat, 2006). The concept of a construction claim is not new, but what has been lacking is the methodology that can help construction managers to assess the level of effectiveness in their construction claim process. The need for such a structured instrument for auditing construction industry practitioners' claim process cannot be overemphasized for the purpose of reducing time and cost increases (Kululanga et al., 2001).

LITERATURE REVIEW

Construction claim is defined as "a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of contract terms, payment of money, extension of time or other relief with respect to the terms of the contract" (Levin, 1998). It arises when a party to a construction contract believes that in some way, by act or omission, the other party has not fulfilled its part of the bargain. Therefore, a construction claim is an assertion of and a demand for compensation by way of evidence produced and arguments advanced by a party in support of its case (Parker, 2013). According to Ajibade (2019), the term "claim" reminds a negative reaction because it signifies the necessity to participate in a frustrating process to gain the relief to which one is contractually and equitably entitled usually after suffering an economic loss.

Several research works confirm the effects of construction claims on cost and time of projects. Construction claim management is the process to control the claims, defined as the seeking of consideration or change by one party in the construction project against another party and the substantially increasing number of constructions claims nowadays, the implementation of the effective construction claim management is needed (Tochaiwat, 2006). Construction claims can be caused by several factors. Understanding what causes construction claims is the first step in understanding and avoiding them. In general, construction claims occur due to dispute during site possession and handover, design fault, misinterpretation of tender, inspection and approval delay, inclement weather, lack of information, late approval, 'force majeure' and payment delay (Danuri et al., 2012). Claims in a construction contract have varying implications on different parties associated with a construction contract such as

claim for extra money and extension of time, risk on quality, health and safety, misunderstanding among the project participants, loss of credibility and chain management and leave harmful impact on projects (Gholhaki et al., 2016). It can be divided into 3 main categories; claim of time, claim of money and variation claim and there are 6 important stages involve in construction claim process. It starts with identification followed by notification, examination, documentation, presentation and negotiation of claims (Charehzehi et al., 2017). In Malaysia, there are four institutions and organizations that produce standard forms of construction contracts. These are Jabatan Kerja Raya (JKR), Pertubuhan Arkitek Malaysia (PAM), Construction Industry Development Board (CIDB) and The Institution of Engineers, Malaysia (IEM). The two most commonly used which is PWD203 produced by Jabatan Kerja Raya Malaysia and PAM2006 by Pertubuhan Arkitek Malaysia.

A need for an overall step-by-step procedure for claims analysis and administration is crucial for achieving proper resolutions and for preventing claims from developing into disputes. Although the process is general to a certain extent, each particular node can be further developed, depending on the peculiarities of each claim and project (Enshassi and Mohamed, 2009).

According to Enshassi and Mohamed (2009), although the extensive studies on claim management theories and practices, the increasing incidence of claims and disputes imply that the current claims management principles and process are ineffective in meeting industry requirements. Because of the unpredictable nature of construction projects, it is also unrealistic to expect that claims can be avoided or resolved by a single principle or method. The improvement of construction claims management will be a long strategic task for the industry (Tochaiwat, 2006).

PROBLEM STATEMENT

Even though construction claims have considerable effects on the projects, they are not always given adequate considerations. Construction claims and disputes can occur in both publicly and privately funded projects, and in projects with small, as well as large funding. In fact, no project can be considered protected from a potential claim. Such claims can lead to significant financial damages. Therefore, all parties including the owner, designer and contractor should fully understand the claim process (Enshassi and Mohamed, 2009).

They also need to be prepared and well-versed in how to identify, prepare, and defend a claim. For this reason, the claim management process should be clear and understood by all project parties, especially the contractor so that they know how to present claims in a way that ensures receiving their rights (Enshassi and Mohamed, 2009). Inadequacies of supporting evidence, stemming from unaware project personnel as well as improperly designed documentation system, are also serious shortcomings causing a loss of chance to recover incurred damages. The management level needs to pay more attention to these aspects for having an effective claims management system (Chovichien and Tochaiwat, 2006). Construction claims have such high impacts on construction projects' cost and time that an effective claim management system in an employer's organization deserves serious attention (Surawongsin, 2002).

In Malaysia, Pertubuhan Arkitek Malaysia (PAM) Standard forms of contract 2006 and Public Works Department (PWD) Standard forms of contract 203A These are the most common types of standard forms of contract being used in construction industry. All local Standard forms of contract has list out claim event that will entitle the contractor for the loss and expenses. However, there are no clear guidelines and explanation on what are the appropriate procedures as a guide for the claimant in substantiating their claim. As a result, many claims have been unsuccessful due to the reason such as the application is not in proper order, a lot of information that are supposed to be there but are not, and the quality of submission are not up to the standard. A clear explanation is needed in order to assist the contractor in preparing the claim. A proper documentation and complete evidence relating to the delay events is required so that it will help the consultant in assessing the claim submitted by the contractor especially for the newcomer in the industry. Claim management process should be clear and understood by all project parties particularly the contractor to ensure their rights on the claim.

RESEARCH METHODOLOGY AND ANALYSIS

In this study, there are four methods used for data collection. Firstly, non-empirical theory gathered from the extensive literature review forms. A literature review is about 'making critical and systematic references to documents which contain ideas, research designs, data and details of information gathering methods related to a research topic' (Piaw, 2012). The literature review in this research was undertaken to searching existing literature/researches in related domains of this research. Following an extensive review on previous related researches, consolidated by observation and informal interview with industry experts has resulting the selection of a single topic to be research. Other than facilitating the process of narrowing down topic from its broad perspective, findings from observation, informal interviews and literature review has introduces key problem to be addressed in this research.

Secondly, the quantitative method of questionnaire surveys was used to gather primary data to discover the problems associated with the claim process experienced by the contractors and the quantity surveyor consultants and to identify the areas related to claim process that can be effectively improved. The questionnaire survey was drafted based on information obtained through intensive literature review on construction claim process in Malaysia. The questionnaire was drafted with the principle of gathering information on the reasons, problems and suggestions for improvement of the claim process. To achieve the objectives of this research, the questionnaire survey was drafted with four main constructs. The main constructs of the questionnaire are:

i. Respondents understanding of claim process.
ii. Respondents understanding of claim management.
iii. Respondents understanding of the problems related to unsuccessful or problematic claim.
iv. Sufficiency of the current claim practice law and procedures.

The respondents were classified into two (2) groups, namely those who have experience with claim management for less than 10 years and those who have less than 10 years.

Table 1. Questionnaire Respondents

Year Group	Contractors		Quantity Surveyor Consultants	
	Number	Percentage	Number	Percentage
Less than 10 years	73	45%	29	34%
More than 10 years	91	55%	56	66%
Total	164	100%	85	100%

Questionnaire survey was applied in this research with the intention of getting the general overview on construction claim related to the construction industry practitioners. It is very important to gather the general perception of the respondents in order to solicit further in-depth data relevant to the issues. The general perception of the matter will act as guidance to the researcher in identifying the main issue to be explored further. The questionnaire tool is applied with the intention of exploring the general perception of respondents over the issue concern.

G7 and G6 registered contractors and quantity surveyor consultants in Malaysia were selected as the primary respondents for this questionnaire survey. The questionnaires were sent to 1200 contractors. In addition to that, another set of questionnaires were sent to 600 quantity surveyor consultants to get the other side of opinion. The lists of the respondents were obtained from the Construction Industry Development Board Malaysia (CIDB) and Royal Institute of Surveyor Malaysia (RISM) registry. The process on sending the questionnaire survey took eight (8) months to be completed due to poor response rate. It must be conducted in two rounds as the reply is very low. Within this period, reminder has been sent via phone calls and emails. 164 sets of answered questionnaires from the contractors and 85 sets are from the quantity surveyor consultants managed to be collected.

According to the feedback from the respondents, extra works is the most common types of construction claims followed by changes in design and extension of time. The main reasons of the claims are due to design changes being introduced at the post-tender stage, project being implemented in unduly short time periods with inadequate site investigation, design work, tender and contract documentation and inadequate definition and/or specification of the precise scope of contract works. The foremost problem in each of the stage are stated below:

- Identification stage - lack of awareness of site staff to detect claim and insufficient skilled personnel for detecting a claim.
- Notification stage - inaccessibility of supporting documents needed for notice and poor communication/instruction to proceed with submitting the notice.
- Examination stage - unavailability of records used to analyses and estimate the potential recovery and unavailability of records used to analyse and estimate the potential recovery.
- Documentation stage - verbal instruction by owner and some information/instruction is not kept in writing.
- Presentation stage - inaccessibility of relevant documents to submit along with the claim and insufficient skilled staff in preparing a claim submission.
- Negotiation stage - disagreement arising during negotiation and unsatisfactory evidence to convince other parties.

Thirdly, the qualitative method of in-depth interview which validated data obtained from the quantitative data. The interview is meant to get in-depth data related to the research problems. The general perceptions of the respondents were collected through set of questionnaire survey. The respondents of the interview were selected among contractors and quantity surveyor consultants with practicing experience of ten years and more. The respondents for in-depth interview are professional contractors and quantity surveyor consultants registered with Construction Industry Development Board Malaysia (CIDB) and the Royal Institute of Surveyor Malaysia (RISM) respectively. The respondents for interview consist of 25 contractors and 19 consultants that involved in the construction industry with minimum of ten years of experience. The selection was done based on the replies gathered from the questionnaire survey, where respondents of the questionnaire survey were asked to indicate their working experience, as well as their willingness to take part in subsequent in-depth data collection, namely the interview. in addition, references were also made to respective professional bodies in identifying the suitable respondents.

The data gathered exposes the understanding of respondents over construction claim related to the contractors. According to the majority of the respondents, causes of claims are numerous and different. Claims can happen due to delays in construction or materials delivery, weather, owner changes, poor site management, differing site conditions, insufficient plans and specification, failure to disclose important information in the construction phase, work acceleration, schedule issues and weather. Early identification of potential claims is essential to successfully prevail on disputes arising during the course of construction, particularly those involving additional work and compensation. Understanding of construction claim process will lead to a less problematic claim process. Apart from this, the interview replies show the respondents' level of knowledge on various issues of construction claims.

Fourthly, data gathered from the quantitative and qualitative method were forwarded to expert panel interview to validate the final findings towards the framework developed in this research. The objective of having a second set of interviews which involving expert is to get the important findings gathered from the previous data collections reviewed by experts with knowledge in construction claim. Expert interviews completed the triangulation approach adopted in this research, which makes the data more reliable and robust. Expert group interviews are about a person's special knowledge and experiences which result from the actions, responsibilities, obligations of the specific functional status within an organisation. 5 experts were selected to participate. Apart from reviewing the findings, the experts will also evaluate the significant of the issues identified from the previous data collection. With the significant of the findings being placed accordingly by the experts, the issues can be properly evaluated based on the expert's evaluation will completed the triangulation approach adopted in this research, which makes the data more reliable and robust.

From the information gathered in previous data collection method, there are three main issues need to be justified. These issues are the most troublesome and contribute to the significant problems in construction claim process. There are:

i. Claim Identification
ii. Claim Notification
iii. Claim Documentation

In any construction project, when a contractor determines that a possibility of a claim arises, comprehensive preparation and organization is essential and should be promptly undertaken. The contractor usually fails to assemble, organise, and review the facts, evidence, and documents related on the claim on time. The contractor should engage in this effort when memories are fresh and before facts, evidence, and documents are lost or forgotten. Although the contractor should seek early resolution through informal and less tedious means, it is wise to prepare the claim with an eye toward resolving the claim in the formal setting of arbitration, litigation, or another dispute resolution process in case of fail in negotiating an early resolution of the claim.

An effective way to present a claim and resolve a dispute is through the submission of a complete claim document. A claim document is a written synopsis of the claim that can be presented to the opposition at the early stages of the dispute. If formal claim submission is required by the contract, the contractor must follow the contract requirements including complying with notice requirements and deadlines for submitting any documentation supporting the claim. Whether a formal or informal process is followed, the goal of preparing and submitting a claim document is to bring about a prompt and satisfactory resolution of the claim through an informed negotiation. Failing a satisfactory resolution of the claim, a well-prepared claim document provides a blueprint or plan for further claim prosecution.

Respondents manage to evaluate, confirm and confer their personal view based on their experience dealing with claim process. The findings from the expert group interviews, together with the results obtained from the previous questionnaire survey and semi-structured interviews were integrated to form a sound basis for the development of a framework for a successful construction claim process.

RESULTS AND FINDINGS

Resulting from the questionnaire survey, in-depth interview and expert group interview that have been carried out earlier, a framework of claim process can be drawn. This framework can act as a reference to the contractors on the problems and weaknesses of the current claim process and they should try to improve it in order for them to have a smooth and less problematic claim process. In six (6) stages of claim management process, it was identified that these three (3) stages are the most significant of contributing problems in construction claim process. There are:

i. Claim Identification – Poor knowledge and experience of the claim staff and late identification of claim
ii. Claim Notification – Late and incomplete claim notification and issued by unauthorized person
iii. Claim Documentation. – Poor claim documentation and fail to establish the basis of claim

Awareness on the part of the contractor of work aspects that are liable to claims is very important, while the claim is only initiated when it is perceived by the contractor that a causing action on the part of the owner or engineer has taken place. Project team should be aware on the changes of work, claims and variation order instructions. Knowledge and skills to assist with determining the appropriate actions to take need to be enhanced and the earlier a claim

is identified the more options are available to mitigate potential risk associated with it. Client must be formally notified of a claim or a change order if the contractor intends to seek a reasonable claim for additional time or costs. Contractors must extensively document all events relative to interferences, instructions to the contractors, changes to the work, impact by others and all issues to support the claim. Improvement of claim process must be gradually as this involve putting priority to the information required and considers issues which require immediate attention. The approach will soften the learning curve wile progressively educating and improving the current process. Process, problems and followed by recommendation for improvement are clearly stated in the framework. The industry can consider the findings as a guidance for improvement the claim process. The industry can make effort to further improve the claim process and this might involve collaboration among organisation representing the interest of every stakeholders in the Malaysian construction industry. For instance, CIDB (Construction Industry Development Board), JKR (Jabatan Kerja Raya) and PAM (Persatuan Arkitek Malaysia) can collaborate for better presentation and improvement of the construction claim process in Malaysia.

CONCLUSION

It was found that there are three (3) areas that need the most attention which are identification, notification and documentation of claim. Improvement in these areas will lead towards better practice and implementation of construction claim process in Malaysia. The contractors and the consultant will have the clear view and understanding on the problems that they are facing in the claim process and take into attention the recommendations for improvement suggested by the respondents. Apart from this, the professional bodies regulating the laws can also refer to the recommendations for improvement of the claim process. The areas identified can be included in the news bulletin and professional courses conducted by the professional bodies to its members. The finding aims to providing a better insight of the process of claims management. It will try to generate means of improving the claims management process and to guarantee that they will have proper management setup to justify, quantify, and present claims for events under the control of the owner or his agents then chances of prolonged disputes are reduced. The finding can be used to assist contractors in adjusting to a business environment that demands measuring business processes to form a basis for continuous improvement. A need for an overall step-by-step procedure for claims analysis and administration is very crucial for achieving proper resolutions and for preventing claims from developing into disputes.

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