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Journal Objectives

International Surveying Research Journal (ISrJ) is an international journal dedicated to the publication of theoretical and empirical refereed articles, case studies or critical literature surveys in the field of surveying research and policy. The scope of the journal is international in two aspects: it presents to a worldwide readership a view of the surveying practices of particular countries, and it encourages knowledge sharing among researchers, policy makers and practitioners.

The purpose of the **International Surveying Research Journal (ISrJ)** serves to provide a forum for discussion and research to keep abreast of the new technologies developments and to stimulate research in the various surveying disciplines.

Editor's Message

Welcome to this International Surveyors Journal (ISrJ) Vol. 10, Issue June 2022 for the Royal Institution of Surveyors Malaysia (RISM).

This Journal gathers publication of all four divisions in RISM namely Quantity Surveying (QS), Property Surveying (PS), Geomatic and Land Surveying (GLS), and Building Surveying (BS). The publication of ISrJ gives opportunity to the academicians, practitioners as well as students to share their research outcome. We have covered many topics in the last few volumes under the current editorial but there is a vast area within the four divisions still waiting to be explored.

This particular issue consists of five selected papers reviewed by the editorial committee and international experts on current topics which include homebuyer preference, fire safety compliances, home financing constraints factors, cost estimation of heritage building, and delay issues in construction project.

We thank all contributors of the papers to date as we have received many which will be included in the future issues of ISrJ.

Do drop a message and request if there are specific surveying topics of particular interest. Thank you for the readership and hope it is beneficial to all.

Sr Wan Ainon Zuraiha W A Khalid
Editor
June 2022

Homebuyer Preference Among Different Generations in Malaysia

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Abstract
Homeownership refers to the community that owns a house in which they live. In purchasing a house, it would depend on various household profiles. Communities that fall under different generations might shape their demand which directly influences their preferences. This paper examined the buyer preference among different generations, namely Baby Boomers, X, Y and Z. Their saving habits show how ambitious they are in homeownership. The research has included some aspects of product factors that were believed to attract the house buyers in their purchasing decision. Data has been collected using questionnaires that were distributed to respondents in Klang valley Selangor, Malaysia. The data has been analysed using the Correlation and Chi-square test. The finding shows that different generations established different preferences which influence their decision in house purchasing. Meanwhile, Generation Z is ambitious about homeownership, and it shows through their savings habits.

Keywords: *Homebuyer, preference, generation, saving, purchasing decision*

INTRODUCTION

Provision of residential real estate products in the market is created considering the craving demand of the target market. However, the demand for real estate units is dependent on the buyer's choice towards special characteristics attached to the housing unit. The type of house and its features usually create a distinctive attraction to prospective buyers. Property buyers from various profiles will have different tastes and preferences. The potential buyers of different profiles may influence the buying patterns on the housing unit offered in the market (Soon & Tan, 2019). Among the demographic profiles that often affect home purchase rates is the age of the buyer (Bates et al., 2020).

House buyers from different age groups are typically having different tastes and choices. Consideration by young people in the purchase unit is quite different from those who have long working periods or have retired. Obviously, the elderly favours the home features that meet their daily needs. Contrarily, young people also have a particular preference as the key feature they looked for when making decisions in selecting the house. Young people are said to have a stronger financial status than others (Shan et al., 2016) as referring to their positive income (Attanasio et al., 2012) which ultimately leads them to prefer on more luxurious home and exclusion (Tomkins, 1999). Moreover, these groups are said to have a high chance of obtaining financial aid for home financing (Fisher &Gervais, 2011). While older adults are more likely to move to smaller home units (Ruddock & Ruddock., 2016) and request specialized housing that could generate the best quality of their life (Ball &Nanda, 2013). Thus the age of the buyer plays a key role in home purchasing (Opit et al., 2020; Thompson, 2013; Ruddock & Ruddock, 2016). This preference pattern has substantial implications for the future of modern societies (Bo¨rsch-Supan et al., 2009).

These different age levels may be referred to different generations, starting from the baby boomer (born in 1946 - 1964) generation, followed by the generation X (born in 1965 - 1980), generation Y (born in 1981 - 1999) and generation Z (born in 2000 – present). This shows that each generation has different preferences values towards the housing units as offered in the market (Opit et al., 2020; Hasu, 2018). Thus, by focusing on buyers' preferences, this paper aims to examine the extent to which there is a difference of preference among buyers from different generations towards various characteristics of residential properties.

LITERATURE REVIEW

The allocation of housing units in the current market should be able to get the attention of buyers (Majid et al, 2012). The increasing house units in the housing market from time to time have created great competition among property developers. Hence the development of housing projects has gone through a transformation process that initiated the creation of various features within the development of housing projects. These features are believed to influence buyers' decisions in purchasing the best house for them.

Generally, residential properties can be divided into two main components, namely house attribute and housing attribute (Majid et al, 2012; Chin et al., 2004). House attribute can be referred to as an internal aspect that is related to the housing unit itself. Meanwhile, the housing attribute is referred to as an external factor that relates to the environmental quality (Ozer & Jacoby, 2022) within a good neighbourhood (Hong, 2011; Azimi & Esmaelzadeh, 2017).

House Attribute usually relates to property prices (Azimi & Esmaelzadeh, 2017), built-up area, size and quantity of space available in the housing unit such as bedrooms, bathrooms, living area, dining area, kitchen, toilet and car porch (Arimah, 1992; Tiwari and Parikh, 1998; Wilhelmsson, 2000; Tse and Love, 2000; Choy et al., 2012). It also refers to the house type and house price (Chin et al., 2004; Choy et al., 2012). Besides that Bates et al. (2020) stress the quality and security of housing.

Housing attribute refers to any aspect that relates to the surrounding of housing schemes such as available facilities (Zahirovic-Herbert & Gibler, 2020) and accessibility (Ruddock & Ruddock, 2016; Luckey et al, 2018). It may include the short distance between house location, workplace (Choudhury and Ayaz, 2015) and other facilities, such as school, retail outlets and public transportation stations (Hui et al., 2006; Redfearn, 2009; Poudyal et al., 2009). Considerations by home buyers may also concentrate on the availability of parks (Maleket, 2012; Ozer & Jacoby, 2022) and a systematic transportation system (Zondag &Pieters., 2005). Meanwhile, waste management also becomes another important attribute of the housing scheme (Poon et al, 2004; Nagapan et al., 2011) that is preferred by house purchasers.

RESEARCH METHODOLOGY

This study was conducted around the Klang Valley area, a region that is experiencing rapid growth in housing development. Klang Valley is also a developed area with various types of housing

development where buyers and tenants consist of various age profiles. Data were collected through questionnaire distribution using the simple random sampling method. 487 respondents who answered the questionnaire are either the owner of the house or a tenant. The questionnaire includes 33 aspects of housing units; 13 aspects focussed on the components of house unit (HU), while another 20 aspects are generated from the components of the housing unit (HsU). It also involves 11 aspects of demographic details.

The 13 aspects of HU includes house price, house quality, house type, house finishes, house design, interior features, the position of house in the layout plan (Corner lot, end lot and intermediate lot), size of built-up area, size of land, age of the house, topography and property interest (Freehold & Leasehold). Meanwhile, the 20 aspects under the component of HsU includes; Near to Commercial Area, Near to Hospitals, Near to Post Office, Near to Entertainment, Near to Transportation, Near to Place of Worship, Near to Education, Near to Workplace, Environmental Quality, Security, Traffic Congestion, Density, View, Exterior Condition, Availability of Waste Management, Safety Level, Theme or Concept, availability of Child Care and Electric Supply. By using the self-administered questionnaire, the response was based on five Likert-scales (1=Strongly Disagree; 2= Disagree; 3=Neutral; 4= Agree; 5=Strongly Agree).

Data analysis was done through SPSS version 12. Through the descriptive analysis, the actual percentage rates for different generations have been identified. It is followed by a cross-tab analysis of variable generation and ownership status of the house, as one of the respondent's profiles. Through the descriptive analysis, data for 33 attributes of HU and HsU has been run with the Chi-square test to see the significant status of each attribute as indicated through Asymp. Sig (2 Sided) and the correlation value between 33 attributes and generations variable. Through the Chi-square test, a significant variable has been selected for subsequent analysis which is the cross-tab between selected house attributes and type of generations. Each cross-tab result between house attributes and type of generations would be present in a graph in order to see the most affected house attribute by different generations.

RESULT

Figure 1 shows the percentage of different generations of the overall respondents. Out of the 487 respondents, 7.2% represented by Gen Baby Boomers, while 9.9% represented by Gen X and Gen Y had the highest percentage of 58.7%, while the rest is represented by the Gen Z equals to 24.2%.

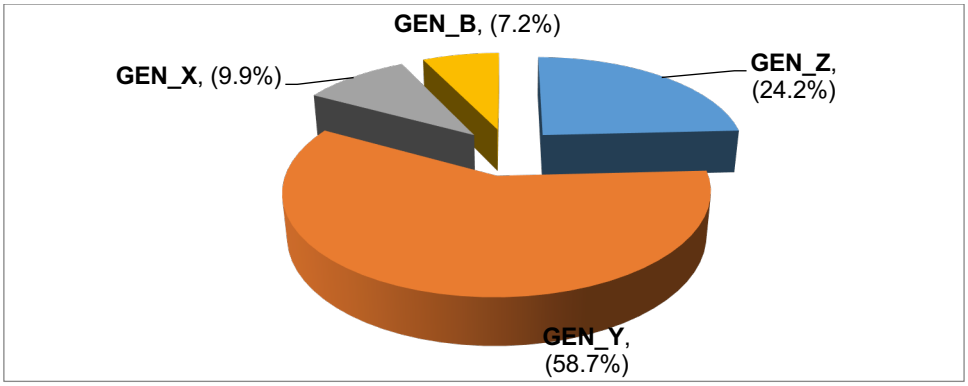

Figure 1. Percentage of Respondent according to a different generation

Figure 2 displays the status of homeownership according to generational differences. The majority of respondents from generation Baby Boomers indicate a high level of homeownership status (82.9%). It is followed by Gen X (68.8%). While 73.3% of Gen Z recorded the highest percentage for respondents who still do not own any of the houses. The majority of them become a tenant for their current residential unit. Gen Y recorded homeownership of 46.3% with the other 53.7% of them still being tenants. This shows that the level of homeownership will increase in line with increases in their age.

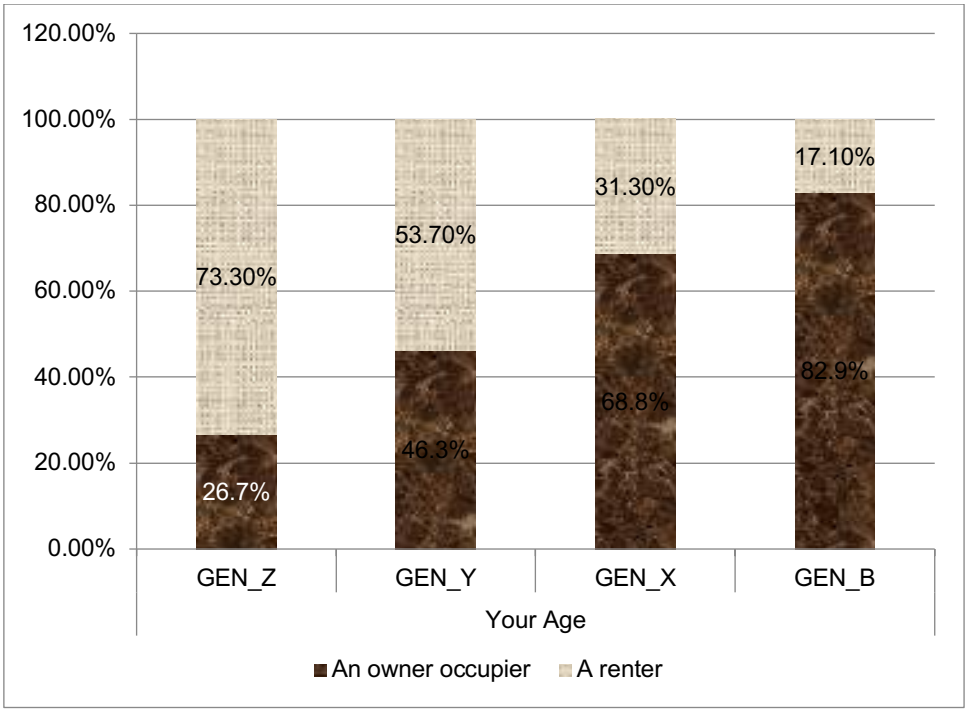

Figure 2. Homeownership status among different types of generation

Table 1 shows the mean score value recorded for all 33 evaluated attributes. Within a considerable scale of 1 to 5, the majority of the attribute indicates a mean score of 3.5 and above. The highest value indicated under HU goes to house price (4.33). While the lowest value refers to interior features (3.69).

Under HsU, the mean score for electricity supply (4.38) and safety level (4.31) indicates the two attributes to become the major concern by respondents. It is followed by the accessibility aspect which is near to transportation (4.14); place of worship (4.11); near to workplace (4.07) and education area (4.07). Respondents are also particular on Environmental Quality (4.18), Security (4.14), Traffic Congestion (4.10), Exterior Condition (4.01) and the Availability of Waste Management (4.03).

Table 1. Mean score for the house and housing attributes

	Aspects	Mean		Aspects	Mean
House Attribute	House Price	4.3333	Housing attribute	Near to Commercial Area	3.9730
	House Quality	4.2261		Near to Hospitals	4.0331
	House Type	3.8817		Near to Post Office	3.7988
	House Finishes	3.8385		Near to Entertainment	3.6778
	House Design	3.7785		Near to Transportation	4.1470
	Interior Features	3.6985		Near to Place of Worship	4.1104
	Position House in Layout Plan	3.8524		Near to Education	4.0704
	Size of Built-up Area	3.9565		Near to Workplace	4.0750
	Size of Land Area	3.9398		Environmental Quality	4.1863
	Built-up Area	3.9708		Security	4.1372
	Age of the House	3.8838		Traffic Congestion	4.1019
	Topography	3.8449		Density	3.9027
	Property Interest	4.0525		View	3.9089
				Exterior Condition	4.0104
				Availability Waste Management	4.0333
				Safety Level	4.3195
				Theme or Concept	3.6812
				Available of Child Care	3.8750
				Electric Supply	4.3838

1.0: Not Important 2.0: Less Important 3.0: Neutral;
4.0: Important: 5.0: Most important

Table 2 shows the result of the Chi-square test that has been generated by SPSS. Indication of the Asymp. value shows the significant status of the 33 attributes being tested, 6 of the aspects studied under HU component have indicated significant status. The most significant status is the position in the layout plan (0.002) and the size of the built-up area (0.002). Meanwhile, another five attributes are the house type (0.034), house finishes (0.041), house design (0.016) and interior features (0.032). Additionally, near entertainment (0.021) is the single attribute that indicated significant status under the HsU. These seven significant attributes had indicated the correlation value between generation profiles of between 21.7% to 31.1%.

Figure 3 shows the cross-section of data between different types of generation and house finishes variable. The graph indicates that 70.7% of Gen Y preferred house finishes. Meanwhile, below 70% of Gen B, Gen X and Gen Z preferred house finishes. It seems like all generations are so focused on the finishing aspect, where the difference scores indicate only 8.2%. This is because the finishing aspect shows the uniqueness and beauty of the building layout.

Table 2. Chi-square test for house and housing attributes on the type of generation

	Attributes	Value	Asymp. Sig. (2-sided)
House Attribute	House Price	18.040[a]	.114
	House Quality	15.825[a]	.199
	House Type	22.360[a]	**.034**
	House Finishes	21.735[a]	**.041**
	House Design	24.729[a]	**.016**
	Interior Features	22.529[a]	**.032**
	Position House in Layout Plan	31.132[a]	**.002**
	Size of Built-up Area	30.482[a]	**.002**
	Size of Land Area	18.958[a]	.090
	Built-up Area	**22.504[a]**	**.032**
	Age of the House	19.723[a]	.073
	Topography	16.373[a]	.175
	Property Interest	14.374[a]	.277

	Attribute	Value	Asymp. Sig. (2-sided)
Housing attribute	Near to Commercial Area	8.336[a]	.758
	Near to Hospitals	16.774[a]	.158
	Near to Post Office	6.781[a]	.872
	Near to Entertainment	23.902[a]	**.021**
	Near to Transportation	7.685[a]	.809
	Near to Place of Worship	16.931[a]	.323
	Near to Education	13.696[a]	.321
	Near to Workplace	13.341[a]	.345
	Environmental Quality	8.132[a]	.775
	Security	15.360[a]	.222
	Traffic Congestion	11.075[a]	.522
	Density	15.681[a]	.206
	View	10.342[a]	.586
	Exterior Condition	14.906[a]	.247
	Availability Waste Management	15.480[a]	.216
	Safety Level	16.324[a]	.177
	Theme or Concept	11.599[a]	.478
	Available of the Child Care centre	15.049[a]	.239
	Electric Supply	5.828[a]	.925

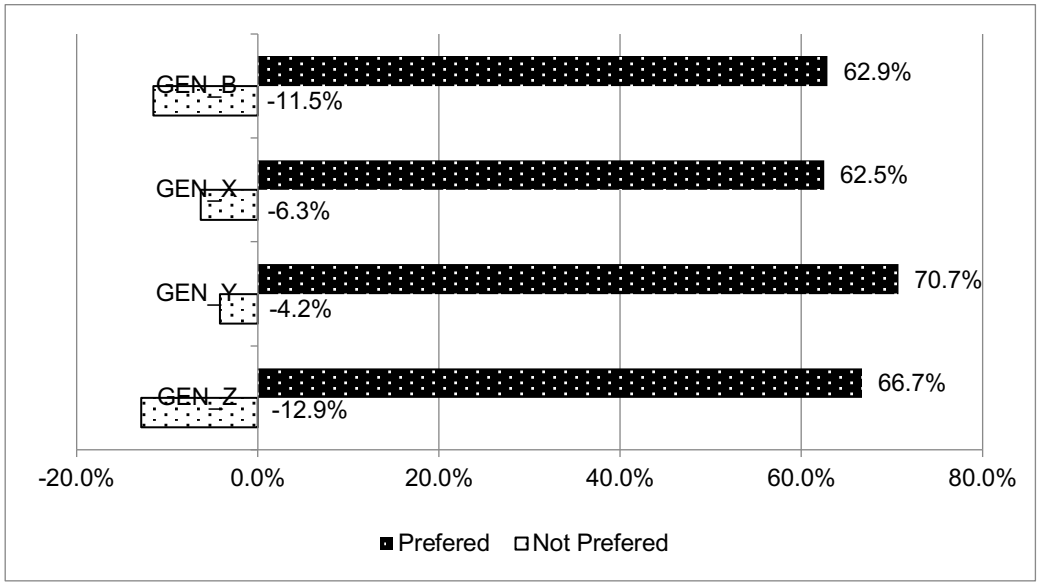

Figure 3. Preferred House Finishes by different generations

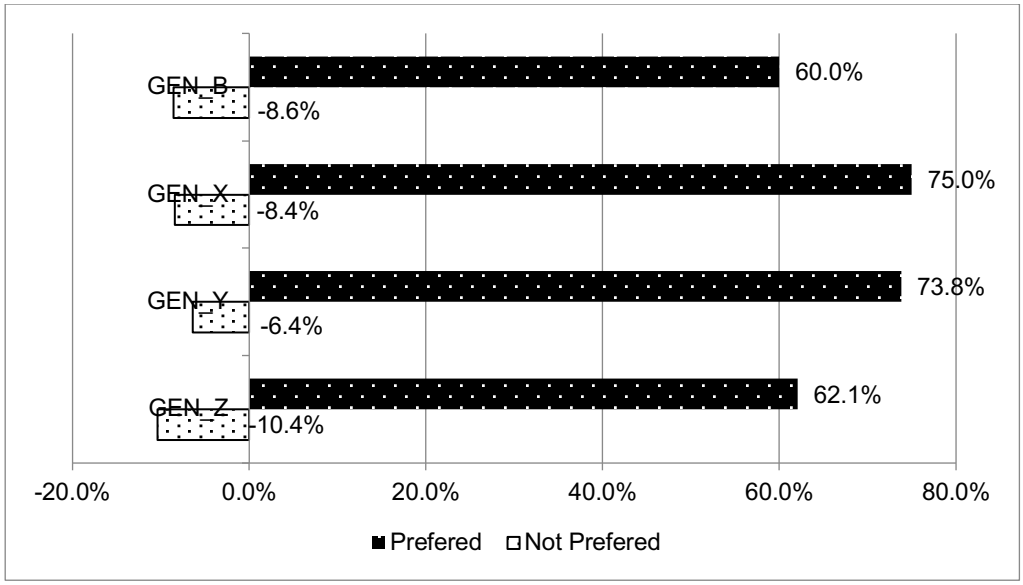

Figure 4. Preferred House type by different generations

Figure 4 shows the cross-section of data between different types of generation and types of house. The graph indicates that 75% of Gen X has considered the house type in making house purchasing and followed by 73.8% of Gen Y. Meanwhile, below 70% of Gen B and Gen Z had preferred this aspect. Gen X and Gen Y prefer the type of house because it symbolizes a person's luxury status in addition to involving high costs in the purchase. Therefore, it is a priority for this group who on average have a stable income and highly prioritize status in life.

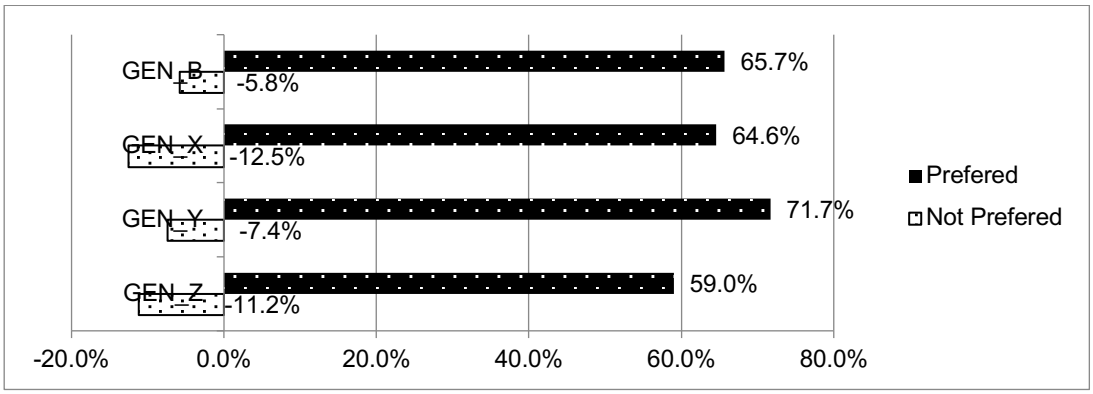

Figure 5. Preferred House design by different generations

Figure 5 highlights the design of various generations. Gen Y was found to have the highest percentage value (71.7%) on the design aspect. Only 59% of Gen Z is giving priority to this aspect. This is because the Gen Y group already has a stable income and at the same time always follows the latest developments in building design that is constantly changing with the times. Therefore, the exclusive building design that will definitely contribute to the high price of a house per unit gets attention from this group.

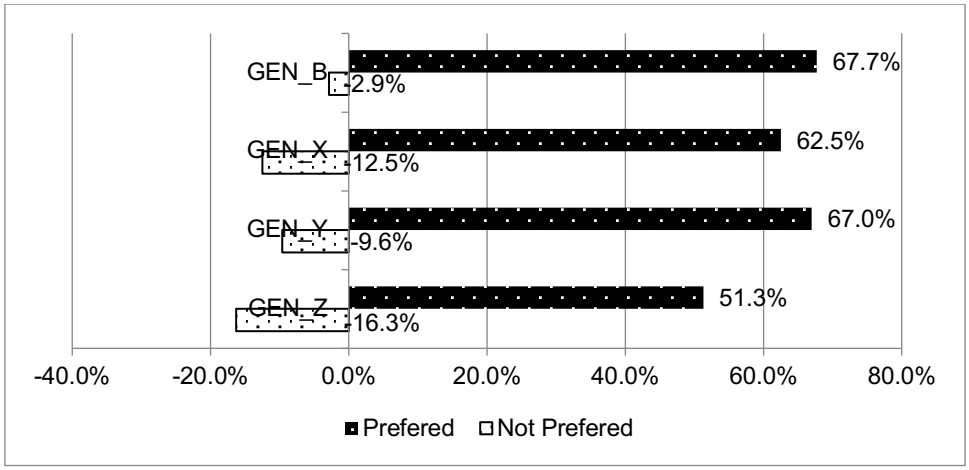

Figure 6. Preferred Interior Features by different generations

Figure 6 illustrates the priority of interior design by various generations. It shows that Gen B and Gen Y have the same value of 67.7%. Only 51% of Gen Z is giving priority to this aspect. The lack of interest among group Z towards interior features is caused by too much exposure to smart buildings development. Residential units that can function for different purposes such as SoHo, SoVo, and SoFo has become more priority compared to Interior Features from the current standard house.

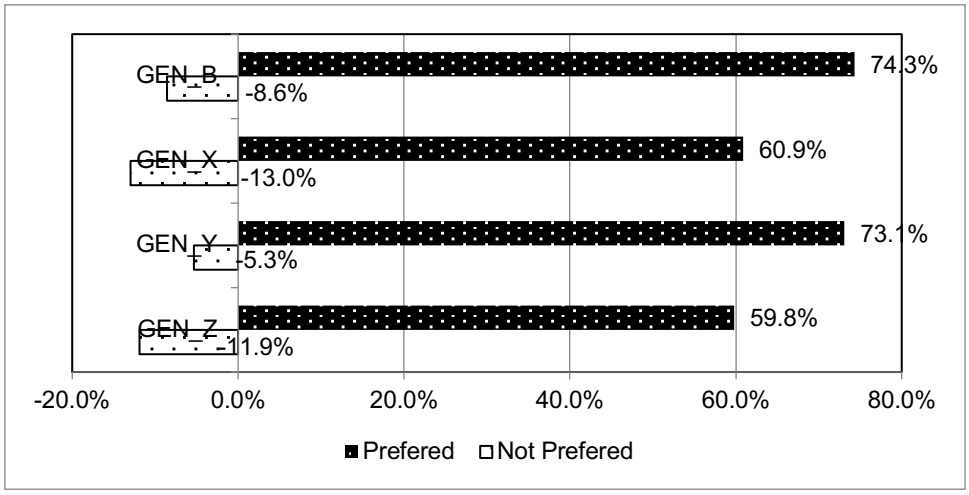

Figure 7. Preferred House Position in Layout Plan by different generations

Figure 7 has shown the preferences of Gen B and Gen Y that emphasize house position in the layout plan (74%, 73%). This shows the position of the housing unit either the intermediate lot, end lot or corner lot which shows the important aspect of their house selection. Gen Z is less concerned with this aspect which indicated 59.8%. House position in layout plan has become a priority by Gen B because the house position as an end unit or corner unit may provide additional space to this group for gardening activities. The same goes for gen Y which tends to renovate the house from additional space as a result of the layout plan.

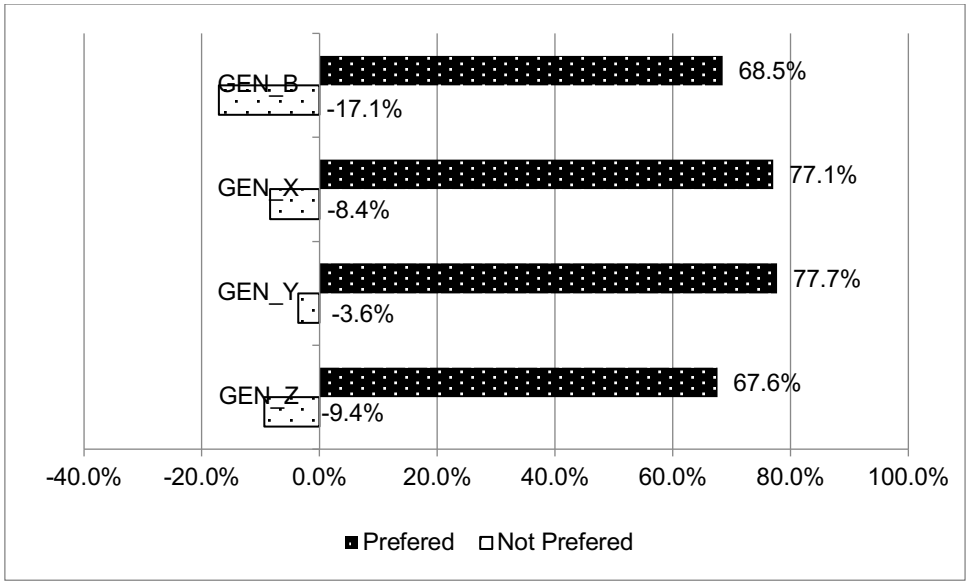

Figure 8. Preferred Size of Built-up Area by a different generation

Figure 8 shows the percentage of equal priority among Gen X and Gen Y which indicated 77% on the built-up area. Wide construction will provide large and comfortable floor space to the occupants. The preferred size of the built-up area has also been considered by 68.5% of Gen-B and 67.6% of Gen-Z as well. The built-up area has become a priority for Gen X and Gen Y because these groups are experiencing an increase in family members compared to Gen B and Gen Z. Therefore, a large house is a priority to provide comfortable accommodation for the whole family.

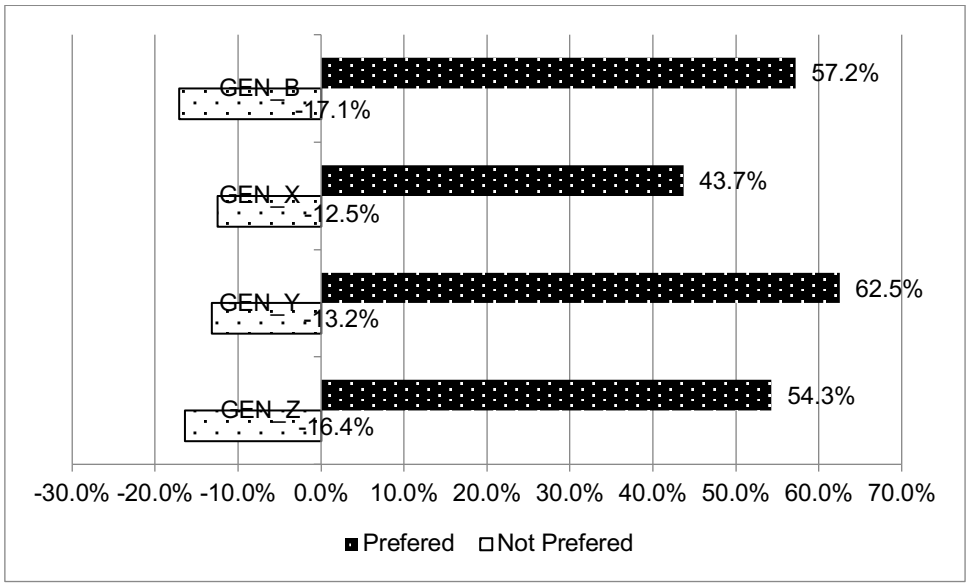

Figure 9. Preferred Entertainment location by a different generation

On the contrary, the location of entertainment is less favourable, especially among the Gen-X (43.7%) showing the lowest preference amongst the generations. This is indicated in Figure 9. The highest indication was concentrated by Gen Y (62.5%); followed by Gen-B (57.2%) and Gen-Z (54.3%). This is because Gen X currently focuses on career development as well as busy managing

family matters. Therefore, the allocation of time for entertainment purposes is very less so that the location of the entertainment centre which is far from home does not affect the choice of their residential building.

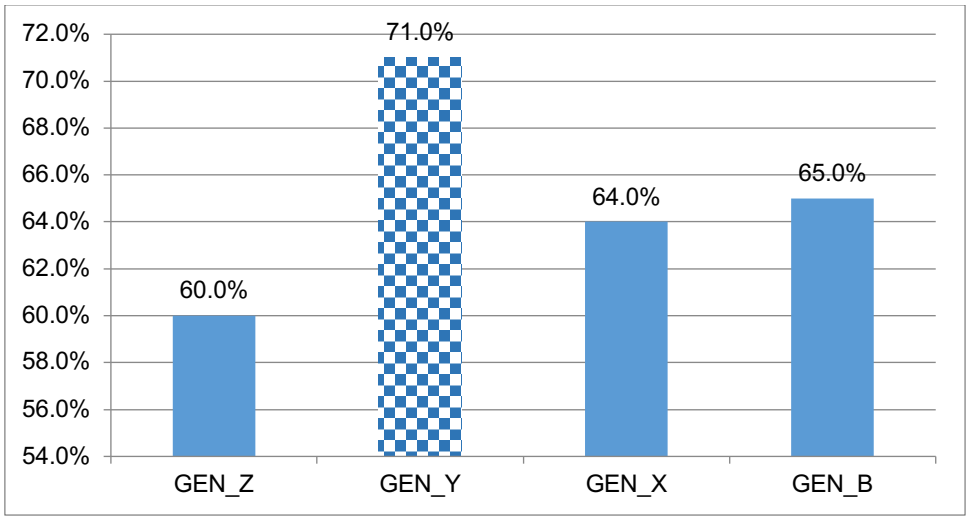

Figure 10. Overall home buyer preference by different generations

In general, Gen Y who is currently the ages of 22 to 41 (born in 1981 - 1999) years old emphasizes the various features of the house is getting the best house for their family. This is because these groups have already entered their careers world. Each of them has begun to accumulate assets to meet the needs of growing families. Therefore, every feature of the house that is explored in this research has gotten attention from this group. This is because they want to provide the best comfortable house for family members.

CONCLUSION

Throughout the seven significant house and housing attributes on home buyers' preference by different generations, Gen Y (71%) was ahead of all other generations. This is indicated by high scores for all of these seven criteria, it proves that Gen Y is among the overly concerned generations on the house and housing attributes in order to obtain the benefits of homeownership. While the priority on interior features and position in the layout plan by Gen Baby Boomer (current age at 57-75 years old) should be given emphasis. The provision of homes that target this group in the future should focus on internal features that are specific to their needs and fulfil their desired abilities. While for landed houses, its development should allocate space for the land either in the front or back of the house to enable Gen B to do leisure and gardening activities even in the middle lot.

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Fire Safety Compliance and Awareness at Government School in Pahang, Malaysia

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ABSTRACT
Fire incidents at schools in Malaysia have been significant highlights recently, which involved property damage and resulted in fatalities. Most schools have do not have an in-house expert in fire safety management. Added with a lack of situational awareness and understanding of the importance of fire safety management, it may increase the risk should there any fire emergency happens. This study aims to improve current fire safety management at school to achieve a safe and conducive learning environment. The research objectives are to assess fire safety compliance at schools, to assess the level of fire safety knowledge and awareness among school academic and administrative staff, and to suggest on how to increase fire safety awareness among staffs at school. A study on several sub-urban government secondary schools in Kuantan, Pahang had been carried out as representatives for rural schools in Peninsula Malaysia. Site inspections, interview sessions with the school management, and questionnaire surveys with the school academic and administrative staffs have been conducted as a mean of data collection. From the study, it was found that overall safety compliance varies between schools, depending on the school management's approach to the fire safety aspect. Generally, all school staffs have a basic understanding and knowledge on fire safety, but their awareness level varies between individuals, with the mean level of above average. Several issues related to fire safety management at schools are lack of in-house technical expertise in managing fire protection system, no formal fire safety inspection being conducted, lack of knowledge and interest on fire safety among school staffs as well as limited financial resources to implement better fire safety management initiatives. Few recommendations were made which includes actions to be taken by the school management itself, interventions by the local community, as well as actions by the authorities.

Keywords: *fire safety, awareness, government secondary school, sub-urban*

INTRODUCTION

Awareness of fire safety among the public in Malaysia is still low. Fire and Rescue Department in their Annual Report 2016 highlighted that awareness among the public in Malaysia on fire safety aspect is still relatively low, and most of them do not care of ageing. Improper electrical wiring on their premises, which reflected on the statistics of electrical fire contributes to more than 50% every year. Statistics obtained from the Fire and Rescue Department (2017) shows that 6,093 cases of structural fires had been recorded in 2016, 6,890 cases in 2015, and 7,134 cases in 2014. Even though the trend is decreasing, the number of cases in 2016 still comprises of 68.79% of the total fire cases recorded and investigated. The level of public awareness on fire safety is still considered as unsatisfactory and need to be improved. Awareness campaigns on fire safety among the public should be increased so that the number of fires can be reduced, especially in schools. According to Chow (2001), fire safety inspections, education and training, fire suppression, emergency service, fire possibility evaluation, fire prevention, reports, and record-keeping and communication are the eight crucial elements in a fire safety management program. Since those elements are related to each other's, if one strategy is being neglected, it may affect others to fail, thus increasing the risk of fire outbreaks.

Meanwhile, school fire had become headlines in recent news. In 2016, a fire outbreak at Sekolah Menegah Kebangsaan (SMK) Tengku Suleiman in Kangar, Perlis, had caused 208 candidates of

Pentaksiran Peperiksaan Tingkatan Tiga (PT3) to be quarantined for about 40 minutes (GPS Bestari, 2016). On 7th October 2015, a fire broke out at Sekolah Kebangsaan (SK) Taman Samudra in Batu Caves, Selangor, engulfing five classrooms and two storerooms, but no deaths or injuries were reported as the teachers had managed to get all the students out when it started (Malay Mail, 2015). On 16th August 2016, two school fires had occurred in Sarawak on the same day, where a hostel block for 30 male students and one room for student management assistant at SK Long Busang, Belaga, was engulfed in fire, followed by another fire at a school block at SK Sundar, Lawas (Utusan Melayu, 2016). There are also several other cases, which had claimed the lives of students as well as property damage, and the results were mostly devastating.

METHODOLOGY

This study aims to assess school fire safety compliance and awareness in order to improve current fire safety management at school to achieve a safe and conducive learning environment. In order to achieve the research aim, the following research objectives are established as follows:

1. To assess fire safety compliance at government school.
2. To assess the level of fire safety knowledge and awareness among government school's academic and administrative staff.
3. To suggest on how to increase awareness of fire safety among staffs in government schools.

This study will focus on government secondary schools in the district of Kuantan, Pahang. The state of Pahang is chosen because it is the largest state in Peninsular Malaysia, with a total area of 36,137 km^2, and a total population of 1,623,200 and population density of 45/km^2, as per data from Department of Statistics (2015). Pahang has a total of 734 schools under MOE, which consists of 539 primary schools and 195 secondary schools as per statistics by the Ministry of Education (2016).

Nevertheless, the number of the fire station in Pahang per total area served is relatively low as to compare with other states in Peninsular Malaysia. Table 1 below shows the comparison of area, number of the fire station and average area covered per fire station based on total area according to state. Based on the table, it is clearly shown that Pahang is the only state in Peninsular Malaysia with the lowest ratio of fire stations per total area, and with the highest average area covered per fire station based on the total area of the states. For this research, the following criteria had been set to select the school for this case study, which are:

1. Type of school and number of students in a particular school session: The schools selected in this study shall be of MOE national secondary school, with the number of students shall be more than 200 in one particular school session.
2. Location of the school: The schools selected in this case study shall be located in a rural area, not in the urban area.

3. Travel distance from the nearest fire station: The schools selected must be located more than 25 km away from the nearest fire station, with an average travel time of more than 20 minutes for a fire truck to reach there.

Based on the above criteria, three schools in the district of Kuantan, Pahang, had been selected in this study, which are SMK Bukit Sagu, SMK Lepar Hilir and SMK Sungai Lembing (Figure 1). This study will focus on-site inspection of current fire safety compliance based on BOMBA requirement under UBBL 1984, questionnaire survey to academic and administrative staff as well as an interview session with schools top management and person in charge of fire safety in SMK Bukit Sagu, SMK Lepar Hilir and SMK Sungai Lembing, Kuantan, in regards to fire safety awareness and management and any fire safety-related issues encountered by the schools, as well as a literature review of related topics. The statistics on fire safety obtained from the Fire and Rescue Department are based on their official Annual Report published for the year 2016. The questionnaire survey form had been distributed through Google Form link to school academic and administrative staffs.

Figure 1. Location of SMK Bukit Sagu, SMK Lepar Hilir and SMK Sungai Lembing from nearest fire station (source: author, based on Google Map, 2019)

LITERATURE REVIEW

Fire Safety at Schools

More schools are being built to cater for population growth in the future. As new schools may incorporate better fire safety features in the design phase, older schools are facing a real challenge in maintaining the current fire protection system, which may be deteriorating over time as the building ages. Moreover, older schools designed and built before 1984 may not fully comply with all fire safety requirements outlined in the Uniform Building By-Laws 1984, especially those in rural areas, thus

putting them at risk. The influence of infrastructures such as roads and the location and distance from the school to the nearest fire station will also have a bearing on how rapidly the Fire and Rescue Service can attend the scene and fight the fire (UK Education Funding Agency, 2007).

Hassanain (2006) mentioned that the leading five causes of school fires are arsons, lack of safety awareness attitudes, faulty electrical systems, low housekeeping standards, smoking and improper storage of flammable liquids and combustible materials. These five causes shall be taken into consideration in fire safety management at school as to prevent fire occurrence and as to ensure continuous fire safety compliance at schools.

The majority of occupants in schools are children and youths who are easily panic and become challenging to manage in the event of an emergency or crisis (Nadzim and Taib, 2014). According to Huseyin and Satyen (2006), middle-aged individuals would respond more accurately to fire than younger and older adults. Children and teenagers tend to quickly get panic in the event of an emergency or crisis and may not be able to handle the situation correctly, thus making it very difficult to manage if there is no proper emergency preparedness and response being practiced.

Fire and Rescue Department's Requirements at School

Uniform Building By-Laws 1984 states that there shall be two or more separate exits from each storey of the building together with additional exits as may be necessary. The number of exits required is dependent on the maximum number of people that occupying the space at a given time, the capacity of each exit, as well as the travel distance to evacuate the area. The escape route must be marked, and a fire exit sign shall be placed in a conspicuous place and visible. Escape route corridors and stairways must be kept clear with no obstruction at all times.

Firefighting equipment shall be kept accessible and maintained in an excellent working condition. Fire extinguishers shall be inspected and renewed its license every year and shall be hanged and marked so that it can be easily accessed during a fire emergency. Other fire protection and suppression system such as fire alarm, fire break glass and fire hose reel shall be well-maintained, easily accessible and not blocked by any object. Housekeeping shall be taken into account as well, as poor housekeeping may prevent a smooth evacuation process during an emergency and may also pose as a fire risk. Flammable materials, gas cylinders and chemicals shall be kept in a designated storage area with proper ventilation and locked to prevent unauthorized entrance. As for electrical safety, no exposed wiring and damaged electrical equipment shall be used.

By-law 166 mentioned that there should be not less than two separate exits from each storey on every building as a mean of emergency escape, and additional exits may be necessary. The exits also shall be accessible at all times. As for the staircase, by-law 168 mentioned that there should be at least two separate staircases as a mean of egress for the upper floor in case of emergency. This is

very important because, if one of the exit or staircases is blocked and cannot be used, there is another one for the building occupants to use to evacuate the building in case of any emergency.

Meanwhile, by-law 172 mentioned that storey exits and its access should be marked with a visible sign, and it shall not be blocked by any decorations, furnishings or other equipment. For those locations where the direction of travel to reach the nearest exit is not immediately apparent, a "KELUAR" sign with an arrow indicating the direction shall be placed so that it will be easy for the building occupant to know which direction they shall take to exit the building during an emergency evacuation. As for exit doors, by-law 173 outlined that all exit doors shall be able to be opened from the inside without the use of a key or any special knowledge or effort, as to ease the evacuation process. Exit doors also shall be able to close automatically when released as to avoid smoke travelling to other parts of the building, and any door devices such as magnetic door holder shall release the doors upon power failure or when the fire alarm is activated.

For fire detection system, as in by-law 237, fire alarm shall be provided as per requirements under the Tenth Schedule. For premises and building with a gross area exceeding 9290 square meters excluding car park and storage area, the alarm system also should have a two-stage alarm system, where a continuous signal indicating evacuation alarm shall be given immediately to the affected area. In contrast, an intermittent signal indicating an alert alarm shall be given to adjoining section to alert building occupants in the area. By-law 238 also requires every large premise or building of more than 30.5 meters in heights to have a command-and-control centre, which consists of a panel to monitor the public address, fire brigade communication, sprinkler, water flow detectors, fire detection and alarm system, and a direct telephone connection to the appropriate fire station by-passing the switchboard.

As for electrical safety, by-law 240 requires an electric isolation switch to be located within a staircase enclosure to permit the disconnection of electrical power supply to the relevant floor or zone served, for every floor or zone of any floor with a net area of more than 929 square meters. As for special requirements for fire alarm systems, if there is any person with hearing disabilities or in a place whereby nature of the occupancy audible alarm is undesirable, visible indicator alarm signal shall be incorporated in addition to the standard alarm system, as required in by-law 241.

FINDINGS AND DISCUSSION

Fire Safety Compliance in Government School

Overall results of fire safety compliance for all three case studies are tabulated as in Table 1. SMK Sungai Lembing was considered as the best example of fire safety compliance by having less non-compliance observed and more fire safety best practices being implemented thus can be rated as useful, followed by SMK Bukit Sagu with compliance rating of above average, and SMK Lepar Hilir, which is rated as fair.

Fire Safety Awareness among Staffs in Government School

From the observation during a site visit and interview session with the school management, as well as from the input obtained from the questionnaire survey distributed to school staffs, it was found that the issues related to fire safety awareness and compliance at school can be grouped into four (4) main issues, which are:

1. Lack of maintenance on the fire protection system at schools
2. no formal fire safety inspection being conducted
3. Lack of knowledge and interest in fire safety among school staffs
4. Limited budget for fire safety promotions and maintenance of fire protection system

Figure 2 summarizes the main issues of fire safety awareness and compliance at school.

Table 1. Overall Results of Fire Safety Compliance in All Three Case Studies

Element	SMK Bukit Sagu	SMK Lepar Hilir	SMK Sungai Lembing
Emergency Response Plan	Basic	Basic	Comprehensive
	Well-documented	Well-documented	Well-documented
	Communicated to all students and staffs	Communicated to all students and staffs	Communicated to all students and staffs
Emergency Response Team	Established	Established	Established
	Not well-documented	Not well-documented	Well-documented
Housekeeping	Overall: Very Good	Overall: Very Good	Overall: Very Good
	Findings: Obstruction on fire safety equipment near the workshop	Findings: Improper storage of materials behind the building	Findings: Chemical storage shall be improved
Fire Safety Inspection	Conducted, but not in a formal way	Conducted, but not in a formal way	Conducted, but not in a formal way
	No proper inspection checklist established	No proper inspection checklist established	No proper inspection checklist established.
	No assigned personnel for a fire safety inspection	No assigned personnel for a fire safety inspection	No assigned personnel for a fire safety inspection
Fire Drill	Last Drill: 2017 (Building evacuation); 2016 (Building evacuation & firefighting) with BOMBA	Last Drill: 28/03/2018 (Building evacuation); 2016 (Building evacuation & firefighting) with BOMBA	Last Drill with BOMBA: 30/10/2017 (Building evacuation & firefighting)
Fire Safety Training & Awareness	Morning assembly; Briefing	Morning assembly; Briefing; Co-curriculum activities	Morning assembly; Briefing; Safety campaign and promotion
Fire Extinguisher	Taken out for service but not being replaced	Inadequate number of fire extinguisher	In good condition
	Hanged at standard height	Hanged too high, hard to access	Hanged low for easy access
Fire Hose Reel	Overall in good condition	Overall in good condition	Overall in good condition
	Some have a missing nozzle	Nozzles are locked inside nozzle box	Nozzles are in good condition

Fire Pump System	Not being monitored/maintained	Not being monitored/maintained	Not being monitored/maintained.
	No technical expert in the operation and maintenance of the system	No technical expert in the operation and maintenance of the system	No technical expert in the operation and maintenance of the system
Fire Alarm System	Fire break glass in good condition	Some fire break glass is found unserviceable.	Fire break glass in good condition
	Some fire alarm panel shows fault on backup battery and had been isolated.	One fire alarm panel had been decommissioned.	In good condition
	No technical expert in the operation and maintenance of the system	No technical expert in the operation and maintenance of the system	No technical expert in the operation and maintenance of the system
	Evacuation Alarm can be activated from a master switch inside the school office.	Evacuation Alarm can be activated from a master switch inside the school office.	Evacuation Alarm can be activated from a master switch inside the school office.
	Public address system available	Public address system available	Public address system available
Fire Hydrant	Visible; comfortable to be located	Visible; comfortable to be located	Visible; comfortable to be located
	Accessible; not being blocked by anything	Accessible; not being blocked by anything	Accessible; not being blocked by anything.
	In good condition	In good condition	In good condition
Evacuation Procedure	Established & updated regularly	Established & updated regularly	Established & updated regularly
	Communicated to all staffs and students	Communicated to all staffs and students	Communicated to all staffs and students
	Basic procedure	Basic procedure	Comprehensive procedure
Escape Routes, Staircase & Corridor	No obstruction on building corridor	No obstruction on building corridor	No obstruction on building corridor
	Very wide; Marked with arrow sign	Marked with arrow sign	No marking
	Emergency exit door at the library was partially blocked.	One staircase was found locked.	Old blocks do not have the second staircase.
Assembly Area	At school field	At school field	At roadside
	Well-maintained; No tall grass	Well-maintained; No tall grass	Outside school compound
	Marked with signage	Temporary / portable signage	Temporary / portable signage
Electrical Safety	Concealed wiring, no exposed wiring observed	Concealed wiring, no exposed wiring observed	Concealed wiring, no exposed wiring observed
	No electrical safety hazard observed	No electrical safety hazard observed	No electrical safety hazard observed
	No technical expert but will engage electrical contractor when needed.	No technical expert but will engage electrical contractor when needed.	No technical expert but will engage electrical contractor when needed.
Access for Fire Brigade	Accessible	Accessible	Some area not accessible for fire engine

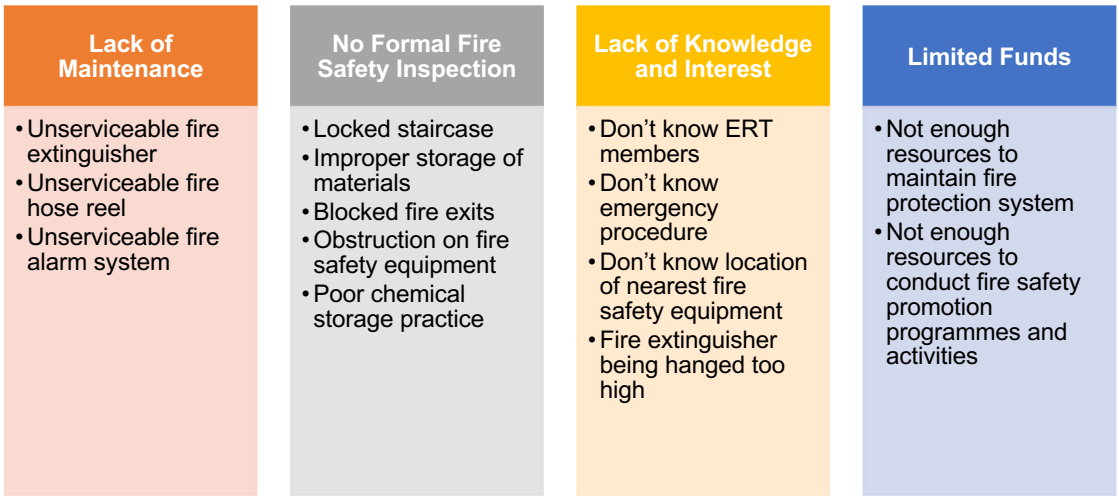

Figure 2. Main issues on fire safety awareness and compliance at school

Recommendations to Increase Awareness among Staffs in Government School

Recommendations are being made based on respondents' response from the questionnaire survey, input from the interviews with school management, as well as from root cause analysis of the issues found from the case studies. Among the recommendations suggested on actions to be taken by the top management in enhancing the level of fire safety compliance and awareness at schools are:

1. To promote participation from students and parents on the fire safety aspect
2. To ensure continuous compliance towards fire safety requirements enforced by the Fire and Rescue Department
3. To establish a joint committee on Fire Safety with the participation of representatives from Parent Teacher Associations (PIBG) and the local community
4. To nurture a culture of care among students and staffs on the fire safety aspect and promote them to report of all abnormalities on fire system, vandalism activities and incident that can lead to fire
5. To enforce safety rules and regulations and to take action on vandalism act on fire safety protection system
6. To establish and maintain a close relationship and cooperation with local and promote their participation in fire safety activities
7. To promote the participation of related agencies such as the Fire and Rescue Department, Civil Defense Department, Health Department, and any other agencies in fire safety activities
8. To conduct monitoring and scheduled inspection on the fire safety system at school and furnish a monthly report to the District Education Office and State Education Office for further action

9. To ensure scheduled maintenance are being conducted on all Fire Safety System to ensure it is working and in good condition and ready to be used during an emergency
10. To encourage organization of activities related to fire safety and promote participation among students and staffs

CONCLUSION

From the three case studies conducted, the results from both interview and observation method on the school management of SMK Bukit Sagu, SMK Lepar Hilir and SMK Sungai Lembing, as well as the results from questionnaire survey that had been distributed to school staffs of the three case studies, were being analyzed and the conclusions were made according to the objectives of the study. It was found that overall safety compliance varies between schools, depending on the school management's approach in the fire safety aspect.

Based on the questionnaire survey distributed to school staffs of SMK Bukit Sagu, SMK Lepar Hilir and SMK Sungai Lembing, it was found that the level of fire safety awareness among school staffs are between above average to good. 86.2% of the respondents had attended fire safety training, 56.9% of the respondents had attended emergency response training, while 92.3% had attended fire extinguisher training. Almost half of the respondents in the case studies are ERT members. However, most of the respondents perceive their level of fire safety knowledge as between fair to right, with 47.7% rated as fair and 41.5% as useful.

It can be concluded that the school staffs are adequately trained on the essential fire safety and able to react in case of fire. However, their knowledge and awareness shall be polished from time to time as to ensure they have the correct understanding on fire safety topic as well as to build their confidence to act in case of a fire emergency.

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Conceptual Paper on the Challenges of Adaptations of Heritage Buildings and Cost Estimation of Conservation Works

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Abstract
At the time of changing economic circumstances, adaptation and conversion of historic structures is an increasingly popular approach. Nevertheless, there are many uncertainties in conservation works which can adversely implicate the cost budget and the quality of the project. The objectives of this paper are to identify the challenges of adapting and restoring heritage buildings and to identify the challenges in estimating the cost of conservation works. The findings showed that there are a total of six challenges in adapting heritage buildings and four challenges in estimating the costs for conservation works. The review highlights several important research areas which aim to improve cost control efficiency and project quality performance.

Keywords: *Heritage, Restoration Cost, Shop House, Boutique Hotel, Georgetown.*

INTRODUCTION

Building conservation works in Malaysia has gained prominence since the joint inscription of the cities of George Town and Melaka as World Heritage Cities in 2008. The increased conservation activities not only benefitted the preservation of culture and history of the cities but also promoted the growth in the conservation subsector of the construction industry. However, as conservation activities increased only fairly recently, the industry felt an acute lack of established procedures in the management of the conservation construction activities. The issues span a wide spectrum, from technical knowledge in conservation methods and materials to budgeting and cost management. Although conservation works are considered as part of the construction sector, there are clear differences between new build works and conservation works due to the different methods and processes involved during conservation and restoration. In looking for similarity with new build work, it is found that conservation works are similar to refurbishment where work consists of small labour-intensive operations scattered throughout existing buildings (Quah 1992).

In any building conservation project, one of the main concerns is the cost of restoration. Owners perceive that conserving a building would cost higher than building a new one. Their concerns may not be far off as the capital cost of restoration could be higher due to the types of construction method as well as the costs of labour and materials (Brandon, 1982). In addition, Dann and Wood (2004) found that conservation of historic buildings requires additional layers of bureaucratic approval and perceived costs that constitute burdens on the clients and building contractors. Although data on construction cost and tendering is abundant but it is mostly on new build works. While conservation projects are increasing day by day, the same cannot be said for research on this area. As such, this study aims to provide a better understanding on the costing of heritage restoration work especially in the conversion of shop house to boutique hotel.

COST OF HERITAGE RESTORATION

The knowledge and data on new build works may not be applicable to conservation works as the process of conserving a heritage building differs from constructing a new building. One of the main differences is the sequence of work where it is a top-down approach for conservation works (Lee & Lim, 2009) as compared to bottom up for new build. As the building is already an existing structure, conservation works do not require structural construction like in new build. Instead, structural repair works may be needed depending on the condition of the building. Restoration usually begins at the roof then proceeds to the internal areas, windows, doors and external façade. Due to the repair works on the roof, temporary roof covering is an important item for conservation works while there is no such need for new build works.

While conservation works has different characteristic from new build, it has similarity to refurbishment works (Quah, 1992) such as it consists of small labour-intensive operations where the works are scattered throughout the existing building. There is also a lack of as-built drawings to guide designer and builder. In addition to that, sometimes the extent of work is not discovered until demounting work has commenced. All these characteristics create difficulty in the planning and estimating works due to the unknowns and uncertainty (Egbu, 1995) in the extent of repair works needed. Such uncertainty does not occur in new build works as the scope and extent of work is clearly demarcated. Similar to refurbishment, conservation works are also carried out in a confined site, sometimes in a dilapidated and run-down condition that creates a challenging and difficult working environment as compared to new build works (Lee & Egbu, 2006).

Another challenging feature in conservation works is the need to use original materials where possible or at the least to match the existing material and design. This is especially important for first grade heritage building restoration and thus the contractor will need to source for original materials or custom order for those out of production materials. Very often, such materials have to be sourced overseas such as in Indonesia or Vietnam where there still exist local craftsmen producing materials such as traditional roof and floor tiles. Not only is the sourcing of materials difficult, the need for workmen is also very specialised and certain type of skilled workmen are needed to perform the work especially decorative work that is no longer used in modern construction. Frequently, local craftsmen are no longer available, and the contractor will have to source such craftsmen from overseas. For example, many conservations work on Chinese temples in this country uses skilled craftsmen sourced from China. This requirement has cost implication which is difficult for the contractors to estimate at the tendering stage and also requires the contractor to have sufficient experience to be able to foresee this problem.

Other requirement that has cost implication for conservation works pertains to the need for special type of tests (Lee & Lim, 2009) to be performed in the early stages of work to provide a reference to the conservator and contractor on the condition of the building, for selection of materials and

construction method. In addition, conservation also requires historical studies to be conducted pertaining to the building before commencement of work. The cost for such study varies rather substantially and is dependent on the client's requirements. Understanding that construction work for new build and conservation differs in terms of work approaches, works sequence, use of materials and labours and the availability of information and drawings, conventional approaches used for new build may not be suitable for conservation works and so it is important to identify and understand the factors that affect the variability in estimating cost for conservation works.

Unlike new build where drawings are available for each part of the building, conservation works may not have such luxury especially if the building is very old and the as-built drawings are missing. As such, without drawings, it is difficult for the conservator or contractor to be able to visualise the restoration works needed during the tendering period. In the event, there is a need to produce measured drawings; the additional requirement will incur extra cost to the entire works. As the full extent of work cannot be determine during the tender period, contractors will usually mark-up the tender according to their own assumption of the works that may be needed in addition to the items listed in the tender document.

As such, it can be seen that construction work for new build and conservation differs in terms of work approaches, works sequence, use of materials and labours and the availability of information and drawings. Considering the differences between new build and conservation works, conventional approaches used for new build may not be suitable for conservation works. Therefore, for the betterment of the conservation sector, it is now necessary to have a bespoke cost estimating model that will enable a higher accuracy in estimating the cost of such works.

Regardless of whether the project is new build or conserving a heritage building, an estimate of the cost is needed before commencement of work. Without this estimate of cost, the client would not know how much does his project costs and at what price can he award the contract to the contractor. Estimating is the process of pricing work based on the information/specification and/or drawings available in preparation of submitting an offer to carry out the work for a specified sum of money which is known as tender sum (Buchan, Fleming, & Grant, 2003).

In estimating the cost of a proposed building, the main resources taken into calculation are labour, plant and material. Labour would include both skilled and unskilled workers. The rates for each type of labour would be quite standard in the industry and each tenderer would need to list out the labour rate in the Schedule of Daywork Rates. Rates for plant are also similar to labour where the rate of each plant will also be listed in the Schedule of Daywork Rates. Materials would be priced according to the supply rate plus allowance for delivery, storage and wastages. In addition to the main cost of labour, plant and material, there is also an addition of overhead cost and profit by the tenderer to arrive at the final tender sum. As such, ensuring that the rates are reflective of the market price is critical in ensuring that the tenders are competitively priced.

Good cost management will enable the tender figure to be closer to the estimate, having good value achieved for the project, reducing project risk, and with budget opportunities and threats fully identified and assessed (Kirkham, 2007). The estimate produced before the commencement of work is usually obtained from the tendering exercise. In addition, tendering is also a way to obtain a competitive price from the potential contractors for the job. Without sufficient information, contractors will be guessing the price of the works and this will affect the accuracy of the tender amount. Therefore, in order to improve the accuracy of tendering amount, the establishment of a range of rates for reference for this new industry is urgently required.

SHOP HOUSES IN GEORGE TOWN, PENANG

The focus of this study is on the conversion of heritage shop houses to boutique hotels in the World Heritage Site of George Town, Penang. Since George Town's inscription into the UNESCO Heritage List on 7 July 2008, there have been increased momentum in restoration works to the historic buildings that are in the Core and Buffer Zones of the World Heritage Site. Collectively, there are a total of 5,013 buildings in George Town's WHS with 2,569 buildings in the Core Zone and another 2,444 buildings in the Buffer Zone (SGP, 2013: A2-4).

However, conservation of historic buildings comes with a huge challenge whereby the process incurs formidable financial costs. Often, such enormous conservation costs and financial outlay have become a deterrent to historic building owners. As reported in the Special Area Plan of George Town (2013), many owners in the WHS find it a burden to restore their heritage properties given that they do not have the financial resources or means to repair or conserve their properties. The shophouses that we see in Penang today are physical evidence of 200 years of shophouse evolution. These shophouses display an integration and assimilation of influences from diverse cultures when George Town was discovered in 1786 by Francis Light as a trading post (Tan, 2015). Broadly, George Town's collection of shophouses can be chronologically and systematically categorised into six (6) architectural typologies namely,

i) Early Penang style (1790s-1850s),
ii) Southern Chinese Eclectic style (1840s-1910s),
iii) Early Straits Eclectic style (1890s-1920s),
iv) Late Straits Eclectic style (1910s-1930s),
v) Art Deco style (1930s-early 1960s), and
vi) Early Modern style (1950s-1970s).

(Source: Tan, 2015)

The restoration works to these heritage shop houses must follow the principles of conservation and need to preserve the historical architecture of the building as well as the townscape.

CHALLENGES IN CONVERSION OF HERITAGE BUILDING

While conversions of historic buildings to high-end hotels have been taking place for decades, the trend has accelerated over the past several years, driven by a demand for one-of-a-kind hotel designs. The following looks at some of the challenges that can be expected when tackling a historic conversion project. There are several challenges that associated with conversion project;

1. Conservation plan

The conservation project needs a correct planning. Stage by stage approach base on conservation process may be a standard practice. However, in practice, the contractor always uncared at dilapidation stage. The choice on conservation sometimes been made without the dilapidation result or base on an assumption. Rushing on repairing will cause future damages to building fabric. To monitor the insufficient works on conservation, the contractor need to submit the method and technique to conserve and must get the approval from conservator before start the works (Harun, 2011)

2. Lack in skill for the worker.

Presently, there are practically lack of labourers and technical experts in conservation methods and techniques. This is the major problem because almost all conservation projects involve both repair and maintenance stages requiring an understanding of and analysis of building defect diagnoses. There is also the question of testing and treating building material, choosing appropriate tools and the methods to conserve the building. Regarding these issues, the responsibility to conservation task is major challenge for conservator. Conservator also acts as project manager, he or she shall strive to attain the highest standards in all aspects of conservation including investigation, treatment, research, and documentation (Harun, 2011; Isa, 2011).

3. Choice in material

Despite on the skill workers, the conservation projects also have a problem in getting the original material to reconstruct the buildings. The materials like roof tiles and timber truss was an unlimited sources. The contractor must get the same material to match with the original material. Regardless of this, the challenges is not only to get the original materials but the contractor needs to expert in interpretation of the needs of the project contract - new material is compatible with original and its must been testing on similar strength, texture, scale and form (Bullen & Love, 2011).

4. Conservation Guidelines for Conservation Works

Appropriate conservation guidelines usually serve as an important tool for the conservator and building contractors. Although National Heritage Act 2005 gives emphasis to the care of listed buildings and declaration of National Heritage, however these regulations need be accompanied with guidelines and technical manual for conservation works (Ghaderi, 2020; Harun, 2011)

5. Lack of architectural aesthetics references

All of the buildings had undergone architectural changes over time. Decisions on architectural aesthetics were supported old photographs and knowledge of artisan craftsmen which are every so often quite difficult to get because of lack of records and time consuming. In Many cases, the look of the ornaments motives was firm on-site, with frequent dialogues happening between the artisan craftsmen and also the owner. The artisan craftsmen would offer consultations on cultural references as they need very strong knowledge during this particular field, which many of the local architects and consultants didn't have (Isa, 2011).

6. Building owners' conflict and inherited building issues

Because of high investment cost for repairs and renovation of historic building, most of the owners jointly owned the property and operated the companies. The unresolved conflict among the partners led to the abandoning of the project and unsuccessful conservation of the building (Harun, 2011).

CHALLENGE IN ESTIMATING COST OF CONSERVATION WORKS

The common practice in estimating costs for new projects often refers to previous past projects that are of similar characteristic. However, the restoration or adaptation of heritage building projects varies from project to project, creating difficulties to estimate the costs because of its unique nature. Tan (2009) identified that among items to include when estimating the cost of the projects are such as archaeological excavation, scientific testing and analysis and temporary roofing. These items are difficult to cost since there is inadequate information.

Another difficulty in calculating costs is the determination of labour costs for heritage buildings, because the construction process may require more skilled workers doing the work (Lee & Lim, 2009). For example, restoring the structure of the roof may affect the finishes of the roof in heritage buildings. The construction method for restoring the damaged building elements should therefore be carefully prepared.

In executing heritage buildings, often additional work such as the requirement to have measured drawings due to the unavailable as built drawings will require additional costs. Due to the ambiguity of the existence of the work, contractors frequently mark up the tender price. (Lim & Ahmad,2015).

The study by Tan (2009) and Lim & Ahmad (2015) only identified the differences of the main items between a conventional building project and a heritage building project. Further analysis of variations in the building elements is needed to provide a better understanding of the price deviation so that a reliable cost estimate can be produced.

CONCLUSION

In conclusion, the literature review has identified several challenges pertaining to cost estimation and the challenges faced in restoring and adapting heritage buildings. The challenges identified indicates several future research areas worth exploring. An important area of research is to explore how to accurately estimate the specific unique building cost elements in heritage buildings. Another important area of research is to investigate the differences of construction work plan for heritage buildings and examine how it implicates the overall construction cost. The findings from these future research areas will facilitate better efficiency in cost control and ensure the quality of the project.

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The Influence of Borrowing Constraints in Securing Home Financing among Potential First-Time House Buyers in the Klang Valley: A Correlation Coefficient Test

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Abstract
Home financing is an option for homebuyers in financing their house purchase. However, there are rising issues on inability to secure home financing, particularly among potential first-time house buyers. Therefore, this study aims to examine the influence of borrowing constraints and the ability to home financing among potential first-time house buyers in Klang Valley. Additionally, the influence of the expenditure pattern is also considered. Questionnaire survey was distributed to gather responses from non-homeowners who reside and/or work in the Klang Valley. The correlation results show that there are relationships between the borrowing constraints (i.e., income, wealth and credit quality constraints) and the ability to secure home financing among the potential first-time house buyers in Klang Valley. However, the correlation between expenditure patterns and the ability to borrow is insignificant. The findings reveal that having sufficient fund to pay down payment, a stable and positive cash flow to pay the monthly instalment and being a creditworthy borrower will improve the ability to secure home financing.

Keywords: *Borrowing constraints; Expenditure pattern; Financing ability; Home financing*

INTRODUCTION

Owning a house is an inspiration and major goal to everyone. Living in home-owning society like Malaysia has somehow pushed the motivations of one to purchase a house. It is commonly understood that a large sum of money is needed to realise the homeownership dream. Thus, financial support from the financier is an alternative in pursuing the homeownership dream. However, securing a home financing may not be a straightforward call to everyone. It can be a challenge to some people and this challenge is apparent among households with liquidity constraint to enter the housing and home financing market.

Past studies have documented that borrowing constraints namely wealth, income, and credit quality constraints affected the homeownership rate (Acolin et al., 2016; Ampudia & Mayordomo, 2018; Barakova et al., 2014; Bourassa & Shi, 2017; Calem et al., 2010). At the same time, the same factors which respectively denoted the adequacy of fund to pay down payment, adequacy of income to pay monthly instalments and good credit background are considered in determining the eligibility of applicants to secure home financing (Bourassa, 1996).

The pressure to let the potential first-time house buyers to secure home financing has led the policy makers in Malaysia to introduce few initiatives such as the MyDeposit scheme, My First House scheme or *Skim Rumah Pertamaku* (SRP), and Special End Financing scheme (SPEF) under the 1Malaysia People's Housing Programme or *Perumahan Rakyat 1Malaysia* (PR1MA) and fund affordable home by the BNM to help the potential first-time house buyers. Despite the initiatives, there are concerns among the stakeholders on the high rejection rate. The developers believed that there were high rejection rates of home financing applications – approximately 60 per cent in average.

However, the banks stated that the home financing approval remained intact between 70 per cent to 80 per cent (Lim, 2017). BNM claimed that the extension of the home financing continues with financiers exercising cautious but practical credit assessment to safeguard the borrowers from borrowing more than what they can afford. This approach is deemed necessary given that the household debt continued to expand from 4.7 per cent in 2018 to 5.3 per cent in 2019 with the highest contributor was residential property loan which had grown from 3.97 per cent in 2018 to 4.58 per cent in 2019 (Bank Negara Malaysia, 2019).

In view of an upcoming home financing burden, a chance to secure a home financing may be challenging especially among the potential first-time house buyers as they need to prove that their financial standing is positive and stable. A careful assessment of the ability to take on substantial financial commitments such as home financing should be done so that the household able to fulfil its debt obligations and at the same time still able to be fine-tuning in meeting household daily expenses. This portrays a healthy financial standing of which is necessary to indicate households' financial resilience in facing any type of economic circumstances.

Against this backdrop, this study aims to examine the influence of borrowing constraints (i.e., income, wealth and credit quality constraints) and expenditure patterns (i.e., financial commitment and household expenses) to the ability to secure home financing.

LITERATURE REVIEW

Earlier studies have found that a household is constrained by underwriting criteria with respect to their income and wealth (Linneman & Wachter, 1989) as well as credit quality (Rosenthal, 2002). Following which, studies by Barakova et al. (2003), Calem et al. (2010) and Acolin et al. (2016) reveal that even after decades the income-, wealth-, and credit-based constraints continue to affect homeownership propensity. Wealth constraints remain to be the top concern among borrowing constraints that hinder homeownership, followed by credit quality and income constraint (Barakova et al., 2003; Barakova et al., 2014; Linneman & Wachter, 1989). The borrowing constraints can be considered as factors that influence the ability to secure home financing too. This is based on the argument that during the credit underwriting process the household needs to show their level of income is sufficient to pay future monthly instalments and sufficient fund to fulfil down payment requirement (Bourassa, 1996).

In a local context, insufficient of income (Ebekozien et al., 2019; Maamor et al., 2016), down payment requirement (Bujang et al., 2015; Mohd Aini et al., 2016; Wahab et al., 2016), stringent home financing guidelines (Bujang et al., 2015; Ebekozien et al., 2019; Malek & Husin, 2012; Wahab et al., 2016), bad credit track record, lack of creditworthiness, debt ratio exceeded the loan-to-value ratio, fear of inability to recover the loan and operating costs from the auction, no evidence of regular income, the high default rate among low-income earners, no collateral or guarantor, entitlement mentality that leads to default and lack of proper documentation (Ebekozien et al., 2019) have caused

difficulties to secure home financing. The findings of the studies have included all possible factors in relation to home financing. Above all, being risk averse institutions, the financiers are interested to grant home financing facilities to borrowers who meet the financing parameters. These parameters measure the amount of credit risks that are bonded with the home financing portfolio once it is approved and executed later.

It is typical that household income has been the main measure of affordability. However, according to Ab Majid et al. (2014), the measurement of affordability to become a homeowner should include household expenditure patterns A large portion of income may be utilised to cope with a household's daily expenses, especially for those with low income. Higher expenditure due to high existing debt commitment and high household expenses can lead to liquidity constraint that will affect the households' ability to borrow. Akin to the study by Sohaimi et al. (2018), measuring housing and home financing eligibility should not only consider the household income but also the expenditure pattern since it can affect the financial standing of the household. Therefore, it is proposed that borrowing constraints (i.e., income, wealth and credit quality constraints) and household expenditure patterns have a vital role in influencing a household's ability to borrow.

METHODOLOGY

This study adopts quantitative approach. The population of this study are the potential first-time house buyers in Klang Valley, Malaysia. Particularly they are working adults who have yet to own a house and aged between 20 to 49 years old. This in line with the population that was commonly committed to home financing (AKPK, 2018). According to Saunders et al. (2009), the appropriate sample size is 384 given the large populations (i.e. more than 1 million). This study applies self-selection sampling technique to get the respondents. The question such as "Are you a homeowner?" was asked at the beginning of the survey to filter the respondent that falls outside the definition of "potential first-time house buyers" (Reed & Mills, 2007). Besides that, the respondents were also asked whether they were residing or working within the Klang Valley area and whether they are Malaysian before they were allowed to participate in this study.

A set of questionnaires was used as the main data collection tool. The self-administered questionnaire was distributed online by using online survey tool namely *surveymonkey.com*. The variables namely income, wealth, and credit quality constraints as well as expenditure patterns (i.e., financial commitments - hire purchase (vehicle loan), credit card, personal loan, education loan, business loan and unit trust loan; and household expenses - healthcare, food and beverages, transportation, utility, communication, household equipment and miscellaneous expenses) have been selected as the independent variables for the study. Whereas the dependent variable was the ability to secure home financing. The independent variables i.e., income, wealth and credit quality constraints and the dependent variable i.e. ability to secure home financing were measured on an ordinal scale and the questions were put in a form of statements. The remaining independent variable

namely financial commitments and household expenses were questioned in the form of payment scale.

The questionnaire was pre-tested among 20 respondents of the potential first-time house buyers in Klang Valley. One of the feedbacks was to reduce the use of technical words in relation to financing terms such as “underwriting”, “delinquent” and “debt service ratio” as they were of the opinion that the use of layman’s term is better understood by a person who are not financially literate. Another suggestion given was it would be easier for the respondent to state the amount of current financial commitments and household expenses instead of in percentage form. Given this feedback, the questions have been amended accordingly.

This study used IBM SPSS to analyse the data. Descriptive analysis and Spearman Rho correlation were applied to describe findings of the study. Spearman Rho correlation was used to investigate the correlation between the borrowing constraints, expenditure patterns and the ability in securing a home financing. Based on Spearman Rho test, the strength of relationship between variables is explained based on the *r* value which can take values from -1 to +1 (Chua, 2013). A positive correlation between the two variables means that when one variable increases in value, it will increase one value of another variable, and vice versa.

RESULTS AND DISCUSSIONS

Descriptive Analysis

The descriptive statistics displayed in Table 1 provides a quick overview of the sample data. Majority of the respondents were aged between 25 to 29 years old (46.4%) and most of the respondents in this study were tertiary graduates (94.5%). In terms of employment background, the results revealed that about 48 per cent of respondents have been working between 1 to 5 years and with 67 per cent of them earned below RM4,000. The income level was found increased (more than RM4,000 per month) over the years of employment. The number of years of employment is foreseen to take on added weight to the household income in view of working experience and the skill sets that developed along the way of employment. Further analysis revealed that 86 per cent of married respondents have their spouse working. Additional income from the spouse would increase the total household income thus improves the eligibility to secure home financing.

Table 1. Descriptive statistics

Item	Category	%
Age	20 – 24	13.8
	25 – 29	46.4
	30 – 34	23.7
	35 – 39	11.7
	40 - 44	4.4
Marital Status	Single	70.3
	Married	27.9
	Divorced/Single parent	1.8
Education Qualification	Secondary education	4.4

	STPM/STAM/Matriculation/Foundation	1.0
	Tertiary education	94.5
Years of employment	Less than a year	15.9
	1 – 5 years	48.2
	6 – 10 years	22.7
	11 – 15 years	8.6
	More than 15 years	4.7
Income level	Below RM4,000	57.8
	RM4,001 – RM8,000	28.6
	RM8,001 – RM12,000	10.2
	RM12,001 – RM15,000	3.3
Source of income	Monthly Salary (full-time job)	93.5
	Wages (part-time job)	20.2
	Regular transfer from parents	3.7
Source of wealth	Regular saving from monthly income	89.1
	Inter vivo (gifts) from family	8.1
	Annual dividend from investment	25.3
	Employees Provident Fund (EPF)	41.9
	Bequest (legacy/inheritance)	4.7
Experience applying home financing	No	80.5
	Yes	19.5
Level of difficulty *(n = 75)*	No difficulty at all	6.7
	Little difficulty	24.0
	Some difficulty	41.3
	Great deal of difficulty	28.0
Reason for home financing applications get rejected	Low disposable income	42.7
	High debt service ratio	25.3
	No credit track record (I am debt-free)	25.3
	Poor credit history (e.g. bad CCRIS record)	20.0

Correlation between Borrowing Constraints and Ability to Secure Home Financing

Table 2 represents a correlation between the borrowing constraints (i.e., income, wealth, and credit quality constraints) and the ability to secure a home financing. The results show significant results in the correlation between the borrowing constraints, i.e., income constraints, wealth constraints, and credit quality constraints, and the ability to secure home financing among the first-time house buyers ($p < .05$).

The correlation value, $r = .310$ indicates a positive weak correlation between the income constraint and the ability to secure home financing (Chua, 2013). The result shows that there are higher possibilities for the respondents to be able to secure a home financing if they manage to overcome the income constraint. A sufficient income is needed as it is the first way out to any financing facilities including the home financing. Joint income is a common option to improve the income eligibility to secure home financing at least among lower income earners (Dotti Sani & Acciai, 2018). However, in contrast with other study (Lee et al., 2018), the present study found that regular financial transfer from parents was not the main means in improving the total income. The

respondents chose to put their own effort such as doing a part-time job or small business in order to mitigate the income constraints.

The result for the credit quality constraints also suggests a positive weak correlation (r = .415) towards the ability to secure home financing (Chua, 2013). The correlation suggests that the more creditworthy the potential house buyers are, the better chances for them to get a home financing to part-finance the purchase of a house. Based on Table 1, credit quality dominated the reasons for home financing applications get rejected. The same reasons were also reported by the Central Bank of Malaysia or *Bank Negara Malaysia* (BNM) (Bank Negara Malaysia, 2020). The study result indicated that being creditworthy is important as it depicts the potential credit exposure. Therefore, the lower the credit risk the more likely for the potential first-time house buyers can secure a home financing.

Next, in terms of wealth constraints, the correlation value of r = .103 shows a very weak positive correlation towards the ability to secure a home financing (Chua, 2013). The ability to pay down payment allows borrower to enjoy lower financing cost and leniency in other credit terms (Stacy et al., 2018). This is because of the impression given on the borrower's commitment in carrying the responsibilities bonded in the financing contract. However, the wealth constraint can be relaxed through the special financing features for affordable housing schemes such as MyDeposit, special end financing scheme (SPEF) for affordable housing programmes (e.g., 1Malaysia People's Housing Programme or *Perumahan Rakyat 1Malaysia* (PR1MA)), and My First Home Scheme or *Skim Rumah Pertamaku* (SRP). The financing features allow the eligible applicants to secure up to full amount of financing. In view of this, the relaxation of wealth constraint reduces the influence on the ability to secure a home financing as compared to the income and credit quality constraints.

Table 2. Correlation between Borrowing Constraints and the Ability to Secure Home Financing

Borrowing constraints	Correlation coefficient	Sig.
Income Constraints	.310	.000
Wealth Constraints	.103	.043
Credit Quality Constraints	.415	.000

The Correlation between Expenditure Patterns and Ability to Secure Home Financing

There are seven types of household expenses based on the previous study by Ab Majid et al. (2014) and six types of financial commitments that are typically secured by a household (AKPK, 2018) that have been selected to conduct the Spearman rho test. The results are presented in Table 3.

The correlation analyses showed that there are no significant correlations between the household expenditure pattern specifically financial commitments and household expenses with the ability to secure home financing among the potential first-time house buyers.

Table 3. Correlation Between Expenditure Patterns and the Ability to Secure Home Financing

Type of Expenditure	Item	Correlation coefficient	Sig.
Household expenses	Healthcare	.052	.310
	Food and beverages	.073	.153
	Transportation	.053	.297
	Utility	.029	.574
	Communication	.030	.561
	Household Equipment	-.043	.398
	Miscellaneous Expenses	.081	.115
Financial commitment	Hire purchase (vehicle loan)	.005	.930
	Credit card	-.031	.551
	Personal loan	-.091	.074
	Education loan	.063	.219
	Business loan	-.010	.840
	Unit trust loan/financing	-.028	.588

The Correlation between Expenditure Patterns and Total Household Income

It is believed that there is a connection between the total household income and expenditure pattern since income is commonly known as the primary source that shapes the cash flow of a household. Therefore, further correlation analysis was conducted to gauge the relationship between the total household income and financial commitments, and household expenses. Table 4 depicts the results of the correlations test. It is apparent that there are significant correlations between the household financial commitments (i.e., hire purchase, credit card, personal loan, and unit trust loan/financing) and the total household income ($p < .05$) with the strength of correlations ranging between .417 and .235. Though the strength of correlations were positive weak (Chua, 2013), it indicates household spending of income on the household financial commitments particularly on hire purchase (vehicle loan), credit card, personal loan, and unit trust financing.

Table 4. Correlation Between Total Household Gross Income and Household Expenditure Patterns

Type of Expenditure	Item	Correlation coefficient	Sig.
Financial commitment	Hire purchase (vehicle loan)	.235	.000
	Credit card	.417	.000
	Personal loan	.140	.006
	Education loan	-.094	.065
	Business loan	.066	.196
	Unit trust loan/financing	.125	.014
Household expenses	Healthcare	.306	.000
	Food and beverages	.254	.000
	Transportation	.254	.000
	Utility	.172	.001
	Communication	.299	.000
	Household Equipment	.075	.143
	Miscellaneous Expenses	.365	.000

The correlation test between household expenses and total household income shows that a majority of the household expenses except household equipment are positively correlated with the total household income (Table 4). Healthcare and miscellaneous expenses have shown positive weak correlations with the total household income - correlation values, *r* at .306 and .365, respectively. Meanwhile, the correlation values between household expenses (i.e. food and beverages, transportation, utility, communication) indicate positive but very weak correlations with the values of correlation, *r* ranging between .172 and .299 (Chua, 2013).

The present results on the correlation between expenditure patterns and the total household income are significant in at least one major aspect. The total expenditures will likely affect the household cash flow and shape the financial standing of one. Mismatch of income and expenditure might lead to the instability of a family's financials (Abd. Rashid et al., 2018). It is crucial for a household to provide adequate financial buffers so they can remain financially resilient in any financial or macroeconomic shocks. The residual income should be sufficient to oblige the existing and upcoming financing commitment and at the same time adequate for the individual to make the ends meet.

CONCLUSION

Home financing facility is important to support the purchase of a house in view of the high price that limits the outright purchases. Nevertheless, it can be a challenge to secure home financing. In response to this, the present study has focused on investigating the influence of borrowing constraints (i.e., income, wealth, and credit quality constraints) and the ability to secure home financing among potential first-time house buyers in Klang Valley. Besides that, the relationship of expenditure patterns (i.e. household expenses healthcare, food and beverages, transportation, utility, communication, and miscellaneous expenses; and financial commitment hire purchase (vehicle loan), credit card, personal loan, education loan, business loan and unit trust loan/financing) and the ability to secure home financing was considered too. The Spearman rho tests discovered that there are significant relationships between all the three borrowing constraints comprising income, wealth, and credit quality constraints and the ability to secure home financing. The results indicate the likelihood of being eligible to secure home financing if the potential house buyers show their ability to pay down payment as required, sufficient income to serve the monthly instalment promptly and minimal credit risk exposure.

The analysis did not show any correlations between the expenditure patterns (i.e., financial commitments and household expenses) and the ability to secure home financing. But further analysis that conducted to analyse the relationship between the expenditure patterns have discovered that there were correlations between financial commitments (i.e. hire purchase/vehicle loan, credit card, personal loan, and unit trust loan) and the total household income. Additionally, the study discovered that there were correlations between household expenses (i.e., healthcare, food and beverages, transportation, utility, communication, and miscellaneous expenses) and the total household income

too. The expenditure pattern determines the level of disposable income to justify a household's financial capacity in taking an additional financing obligation. Overspending and over-indebtedness could lead to financial incapacity to secure home financing.

The findings of the study can be treated as a knowledge-based development in getting secure a home financing. The preparedness in terms of financial capacity and debt management are able to mitigate the credit risk exposure across income groups. A collaboration between policy makers and financial institutions to deliver the information in regard to the understanding of home financing terms and responsibilities in delivering the obligations can assist them in making an informed financial decision. At the same time, being an informed borrower allows them to plan an adjustment strategy to adapt with any changes in the financing costs or capital flow. This adjustment strategy is important in order to maintain a healthy and positive cashflow so not to jeopardise the eligibility to secure home financing.

This study was limited by the absence of other factors such as socio-demographic attributes, housing attributes and financing facilities attributes that can possibly influence the ability to borrow. In fact, an applicant may be coming prepared with good financial background that shows their financing capacity to take on the financing commitment, but they can be discouraged by other attributes such as socio-demographic, housing and financing facilities attributes. It is recommended in the future, studies should include those factors and other factors that may influence the ability to secure home financing.

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Factors Play-Roles for Delay in Construction Project: A Literature Review

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Abstract
Project delay is a worldwide issue that occur frequently, and this can be happens due to many factors. In construction industry can be differentiate into public sector or private sector; the delays is affecting the economics because the biggest client in most countries' construction industry is the government which known as the public sector and this also affecting private project too. The objectives of this study it's to determine the factors contributing to delay in construction project may offer as prerequisite to the current available information has been discuss by previous scholars. There are 38 factors contributing to delay in construction project has been discuss from 49 referred indexed journals between 1980s to 2020. Thus, the outcomes may further contributing to enhance the existing knowledge on factors contributing to delay in construction project among construction players and academia.

Keywords: *delay, construction project, factors contributing, construction industry*

INTRODUCTION

Project delay can be defined as the project completed later than the specified date (Ekanayake, E. M. K., & Perera, B. A. K. S., 2016; Wei, 2010; Shahsavand, P. et al., 2018; Dinakar. A, 2014). In construction industry, delay is a common and crucial issue because it is not only about the time overrun but it also involves the project funds (Zarei.B et al., 2017; Sambasivan and Soon, 2007). For example, there was a Liquefied Natural Gas (LNG) projects in Australia had facing the problems of cost overrun due to schedule delay (Basak. M et al., 2018). Not to mention the impact of delays on the client and contractor, as they can cause projects to become unprofitable, forcing the parties involved to file a claim for damages thus causing relationship issue (Ekanayake, E. M. K., & Perera, B. A. K. S., 2016; Kamanga and Stewen, 2013; Zarei.B et al., 2017; Sambasivan and Soon, 2007).

Delays occur in construction project consistently; it can be differentiated into different types of delay depends on its causes. For instance, a delay can be caused by one or more parties that might affect the completion date and it might result in damage to other party (Arditi, D., & Pattanakitchamroon, T., 2006). However, causes of delay can be classified into different aspects like client related causes, contractor related causes, consultant related causes, external causes and etc. Some of the causes beyond human control such as unusual weather is one of the types of delay that caused by none parties (Arditi, D., & Pattanakitchamroon, T., 2006). Therefore, delay analysis technique is important to determine the causes and effects for resolving delay disputes and claims.

As we know the delays problem is affecting the economics because the biggest client in most countries' construction industry is the government which known as the public sector (OkpalaandAiekwu, 1988). They spent a huge amount of budget to satisfy the demand for roads,

residential and non-residential buildings, commercial buildings, hospitals, factories and schools, etc to stimulate growth of a countries economic (Palani, 2000; Star Magazine, 2014; Babikir Ibrahiem, 2015).

In addition, one of the most common, costly, complex, and risky challenges has been identified as delay. Many studies have been undertaken to identify and overcome the causes of building project delays (Ahmed et al., 2002). The top ten factors affecting the project are contractor, manpower, owner/client and materials categories. In the study of Nawi et al., (2016), the result shows the causes affected the completion time are communication, material delivery and site management. Meanwhile, another study conducted by Azlan et al., (2007), the contractors' perspective towards the project delay because of financial difficulties, defective works, lack of manpower, materials and equipment and poor site management. Therefore, there are still a grey-line in prescribe the factors contributing to the delay and this further leading to the need of outline the factors contributing to the delay in construction project. This paper may further elaborate the recent update on factors contributing to the delay in construction project which to be beneficial to enhance an existing knowledge among not only academia also to construction players.

FACTORS CONTRIBUTING TO DELAY IN CONSTRUCTION PROJECT

On construction projects, delays are the most prevalent and costly issue (Alkass et al., 1996; Ruqaishi & Bashir, 2015; Zarei.B et al., 2017; Wa'el et al., 2007; Basak et al., 2018; Ekanayake & Perera, 2016; Rashid et al., 2013). In Malaysia, over 80% of public projects and 66.7% of private projects encounter severe delays, which always result in a disagreement between project participants (Ramli, 2017; Rooholelm & Aboumasoudi, 2020). The severity of delay is depending on the effects towards the entire project, such as affecting the time deliver, cost overrun, managerial and relationship issues (Zarei.B et al., 2017; Sambasivan and Soon, 2007). Hence, according to Zarei.B et al. (2017) emphasised a project manager is necessary in construction industry on making delay analysis and management.

In addition, delays are defined by some authors in the previous studies as the delivery date of project later than the date stated in contract document or late completion compare to planned schedule (Shahsavand et al. 2018; Dinakar, 2014; Salunkhe & Patil, 2014; Ekanayake & Perera, 2016; Wei, 2010). Delay means failure to complete project in targeted time & budgeted cost as agreed in contract, so easy cause conflict. Delays in construction projects are undesirable to both the client and the contractor as they can make the projects to become unprofitable compelling the affected parties to claim damages.

By referring to Table 1 tabulated, the highest time referred factor is issues relate to financial. It involves financial closure, poor cash flow management, poor financial condition, problems in financing project by contractor, financial difficulties to owner, contractors and subcontractors (Patil et al., 2013; Fallahnejad, 2013; Oyegoke & Al Kiyumi, 2017; Sweis et al., 2018; Prasad et al., 2019; Zidane &

Andersen, 2018; Ahmad et al., 2019; Agyekum-Mensah & Knight, 2017; Amoatey & Ankrah, 2017; Kim et al., 2015; Viles et al., 2019). Second highest time referred is payment delay which is stated in previous studies by Patil S.K et al. (2013), Fallahnejad, M. H. (2013), Oyegoke A.S & Al Kiyumi N. (2017), Sweis R. et al. (2018), Prasad, K. V. et al. (2019), Zidane, Y. J. T., & Andersen, B. (2018), Ahmad H.S et al. (2019), Agyekum-Mensah G. & Knight A.D (2017), Amoatey C.T & Ankrah A.N.O (2017) and Mittal Y.K et al. (2020). It can happen in late payment by clients or delay payment from contractor to subcontractor or supplier.

In addition, the third factor is clients keep changing their orders; therefore, the uncertainty will cause the delay (Patil S.K et al., 2013); Fallahnejad, 2013; Oyegoke & Al Kiyumi 2017; Prasad et al., 2019; Zidane & Andersen 2018; Ahmad et al., 2019; Amoatey & Ankrah, 2017; Kim et al., 2015; Mittal et al., 2020). Other than that, client related causes also involve the 11th factor - Delay in decision-making by the client (Oyegoke & Al Kiyumi 2017; Prasad et al., 2019; Ahmad et al., 2019; Amoatey & Ankrah, 2017; Mittal et al., 2020) and 12th factor - Changes in design by the client (Oyegoke & Al Kiyumi, 2017; Prasad et al., 2019; Zidane & Andersen, 2018; Agyekum-Mensah & Knight, 2017; Kim et al., 2015). A good site management is to ensure the construction project can be delivered on time and within budget; therefore, the fourth factor of delay is poor site management and supervision (Patil et al., 2013; Ruqaishi & Bashir, 2015; Sweis et al., 2018; Zidane & Andersen, 2018; Agyekum-Mensah & Knight, 2017; Kim et al., 2015; Kazemi et al., 2020; Viles et al., 2019).

Experience is always important no matter in life or any specify industry like construction industry hence the more experience the more proficient, then the shorter time. Thence, lack of experience and competence of the owners, consultants, contractors and subcontractors has concluded one of the causes. (Oyegoke & Al Kiyumi, 2017; Sweis et al., 2018; Zidane & Andersen, 2018; Amoatey & Ankrah, 2017; Kim et al., 2015; Mittal et al., 2020; Viles et al., 2019). According to Patil et al. (2013); Ruqaishi & Bashir, (2015); Oyegoke & Al Kiyumi, (2017); Sweis et al. (2018); Zidane & Andersen, (2018) and Agyekum-Mensah & Knight, (2017), the authors believe a reasonable planning and scheduling should be arranged properly; therefore, inadequate planning & scheduling of contractor also been known as one of the causes. Followed by the poor co-ordination between each party (Patil et al., 2013; Ruqaishi & Bashir, 2015; Sweis et al., 2018; Ahmad et al., 2019; Mittal et al., 2020; Viles et al., 2019). This is because cooperation between the construction stakeholders is importance to reduce the conflict and yet the project can be proceeded smoothly.

Furthermore, construction materials are the main element of a project as proverb says make bricks without straw, therefor delay in delivery of materials become the 8th factor (Fallahnejad, 2013; Ruqaishi & Bashir, 2015; Sweis et al., 2018; Shebob et al., 2012; Ahmad et al., 2019; Agyekum-Mensah & Knight, 2017) while lack of equipment and materials are the 13th factor (Shebob et al., 2012; Zidane & Andersen, 2018; Agyekum-Mensah & Knight, 2017; Kim et al., 2015; Kazemi et al., 2020). According to Oyegoke & Al Kiyumi, (2017), Sweis et al., (2018), Prasad et al., (2019), Shebob et al., (2012), Zidane & Andersen (2018), Agyekum-Mensah & Knight (2017), labours are the main

staff during the constructing process; therefore, lack of labours will cause delay on the constructing schedule. Followed by 10th factor – "Delay due to land acquisition" (Patil et al., 2013; Fallahnejad 2013; Prasad et al., 2019; Ahmad et al., 2019; Amoatey & Ankrah, 2017). Other than that, drawing related causes are the second last involved too, such as acceptance process on drawings, permits, tests and samples too long (Sweis et al., 2018; Shebob et al., 2012; Ahmad et al., 2019; Agyekum-Mensah & Knight, 2017) and the least time referred cause is ambiguities, mistakes, and inconsistencies of drawing (Shebob et al., 2012; Zidane & Andersen, 2018; Ahmad et al., 2019; Kazemi A. et al., 2020).

METHODOLOGY

In this research, starting from literature review, it is a comprehensive summary of previous research on a topic (Michael Coffta, 2020). The data gathered from previous journals regarding definition of delay, types of delays, factors contributing to delays and the delay analysis techniques was used in chapter 2 of this research. By referring Table 2 that show the total journal referred on the year of published between 1986 – 2021.

Table 2. Journal referred according to the year published

Year of published	Total time referred
1986	1
1987	1
1996	1
1997	1
1999	1
2000	1
2002	1
2005	1
2006	2
2007	2
2008	3
2009	4
2010	2
2012	1
2013	3
2014	2
2015	2
2016	1
2017	5
2018	6
2019	3
2020	4
2021	1
Total journal referred	49

Table 1. The factors contributing to delay in construction project

No	Author,year / Factors contributing to delay	Patil et al (2013)	Fallahnejad (2013)	Ruqaishi & Bashir (2015)	Oyegoke & Al Kiyumi (2017)	Sweis R. et al (2018)	Prasad et al (2019)	Shebob et al (2012)	Zidane & Andersen (2018)	Ahmad et al (2019)	Agyekum-Mensah & Knight (2017)	Amoatey & Ankrah (2017)	Kim et al (2015)	Mittal et al (2020)	Kazemi et al (2020)	Viles et al (2019)	Times referred
1	Delay due to land acquisition	/	/				/			/		/					5
2	Environmental issues related with project	/						/			/						3
3	Financial issue	/	/		/	/	/		/	/	/	/	/			/	11
4	Change orders by the client	/	/		/		/		/	/		/	/	/			9
5	Poor site management and supervision by contractor	/		/		/				/	/		/		/	/	8
6	Delay in progress payments	/	/		/	/	/		/	/	/	/		/			10
7	Difficulties in obtaining work permits	/	/											/			3
8	Inadequate planning & scheduling of contractor	/		/	/	/				/	/						6
9	Poor co-ordination between each party	/		/		/			/					/		/	6
10	Slow response from the consultant to contractor inquiries	/			/								/				4
11	Problem with subcontractors		/	/													2
12	Poor management of contractors' schedules			/													1
13	Delay in delivery of materials		/	/		/		/		/	/						6
14	Unrealistic contract durations imposed by client		/														1
15	Slow delivery of material by client		/			/						/					3
16	Type of project bidding and award		/														1

17	Selecting the lowest not the best bidder by the client				/												1
18	Delay in decision-making by the client				/		/			/		/		/			5
19	Changes in design by the client				/		/		/		/		/				5
20	Insufficient number of workers				/	/	/	/	/		/						6
21	Delay in settlement of main contractor's claims by the client				/		/										2
22	Political situation					/											1
23	Experience and competence of the owners, consultants, contractors and subcontractors				/	/			/			/	/	/		/	7
24	Long acceptance process (shop drawings, permits, tests and samples)					/		/		/	/						4
25	External work due to public agencies (roads and public services)							/									1
26	Rework due to errors during construction							/				/				/	3
27	Shortage of required equipment or materials							/	/		/		/		/		5
28	Rise in the prices of materials							/							/		2
29	Ambiguities, mistakes, and inconsistencies of drawing							/	/	/					/		4
30	Delay in approving changes in the scope of work by consultant									/							1
31	Inflexible funding allocation for project items											/					1
32	Delay in site mobilization											/					1
33	Weaknesses in the laws and regulations														/		1
34	Tax laws, tariffs and customs duties														/		1
35	Change in government policies														/		1
36	Personal differences between employees														/		1
37	Variation										/					/	2
38	Low productivity															/	1

CONCLUSION

Several factors contributing to delay in construction project has been identified and discussed further in this paper. There is a factor that having highly times refereed globally which supposed to triggered as main factors to look seriously when it comes to solve or to minimize the impact from the delay in construction project itself.

The fundamental on the analogies of the delay in construction project it's a crucial understanding to overcome the issues. Where, this can be further enhancing when every each of the parties involves in construction industry plays their own roles and ultimate aims to comes as one its support. There is no use to enforce if no empowerment by the relevant parties.

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