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The Effective Characteristics of An Urban Park Through Visitors Perception Case Study: KLCC Park

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ABSTRACT

In industrializing and urbanizing countries such as Malaysia, urban parks play an increasingly important role in contributing to the quality of urban life and environment. The main aim of this study is to evaluate the effective characteristics of an urban park and the implementation of park management by the private organization at KLCC Park towards increasing the value of life for people living in the city. The objective of this study is to gain an insight into visitors' perception of the effectiveness of the KLCC Park and an overview of the park management by KLCC Park. This study used a mixed methodology approach. This research used questionnaires as the instrument to record respondents' perspectives and conducted an interview with a key manager of KLCC Park Management. There were 320 respondents who participated in this study. The study involved a comprehensive literature research on the criteria of urban park effectiveness, passive engagement opportunities and active engagement opportunities, accessibility and safety. The benefits received by the visitors play an important role towards the effectiveness of the place. The results of the study indicate that urban park is receiving increasing attention from visitors, but that planning and management are still not optimal. The finding in term of planning and management of the park can conclude that urban planners and green space managers need to ensure that green spaces meet the demands and preferences of visitors and institutional structures are important for sound green space planning and management. Kuala Lumpur City Centre (KLCC) Park, offers a calm and harmonious environment in the midst of the hustle and bustle of a busy and dynamic city and dissipating the tensions of city living. It was concluded that the criteria of comfort felt by the visitors were very important to the assessment of an effective urban park.

Keywords: *Urban Park, effective criteria of urban park, benefits of urban park, urban park planning and management.*

INTRODUCTION

Open space is defined in Town and Country Planning Act 1976 as land laid out as a public garden, or used for the purpose of public recreations, or land which is a disused burial ground. Furthermore, open space provides a benefit to the community surrounding and can be used for recreational activities, as storm water drainage for wetlands and forests and wildlife habitat. Farms and urban forests provide aesthetic and benefit to surrounding residents of rapidly growing urban and suburban area and the environment (Greene et al 2018; Cheung and Tang 2016).

An important contributing factor affecting the deterioration of the environment is population growth. The high demand for land in urban areas has also led some local authorities to overlook the standards required for open spaces, recreational areas and forested areas (Linde et al. 2018).

Parks are designed for recreation and will give huge benefits to the urban residents by improving public health, social well-being and enhance public enjoyment of the local environment (McRobie, 2000; Christiansen, Coner and McCrudden, Paloma *et al* 2017). Urban parks have a strategic standing for quality of life in our urbanizing society and play a substantial role in increasing the live-ability of cities (Biddulph, 1999).

The different types of open spaces have different kinds of opportunities and constraints. Some research has recognised, explored and identified the needs and preferences of recreational users including parents and children's need towards park facilities, and surrounding (Bjerke *et al.*, 2006; Tucker *et al.*, 2007 and Linsey 1999). Other researchers argued that improving the quality of open spaces i.e. its natural features and delivery of social interaction and reducing the level of annoyance will help to improve the quality and access to urban parks which will directly increase the quantity of outdoor activities among older people (Sugiyama and Thompson, 2008). Urban parks differ in character and purpose. Low *et al.* (2005) propose that recreation is always an important park value, but the presence of other landscape values enhances the park's function and use. Studies into the effective characteristics of urban parks in the nation is still lacking and therefore the aim of this study is to identify the criteria on effectiveness of urban park at Kuala Lumpur City Centre (KLCC) Park and to identify the benefits of urban park towards visitors.

LITERATURE REVIEW

Urban Park

Urban Park is considered any public space designate inside a populated place to provide passive or active recreational (Hami 2009; McCormack 2010). In addition, from an environment perspective urban park is described as a helpful spot to learn and comprehend the relationship between setting and also the effect of the environment on human behaviour (Whyte 1998). Similarly, Wong and Domroes (2005) defined urban park as a valuable source of delight for users along with an enjoyable place for city residents to flee in the demands and stresses of Urbanism. Probably the most comprehensive and appropriate description of urban parks within the facet of current existence style is driven from Lamtrakul *et al* (2005) which defined urban parks as public spaces within the metropolitan areas include eco-friendly spaces for leisure activities and social existence, natural setting, aesthetic purpose, education, and cultural heritage.

Characteristics of Urban Park

In a recent study by Bedimo-Rung *et al.*, (2005) the characteristics of urban park have been classified into six categories i.e. physical features for facilities and amenities, maintenance, access availability and proximity, attractiveness and appeal, personal security and fear. Last but not least, policies, management and budget. It has been argued that, characteristics of environment influence place identity.

Elements of Urban Park

In planning the park choose of the element should be details, the reason is to make sure the park will function and have the esthetical value. The element can be classification into: the element and landscape. On the types of landscape, it divided into two, which is the first is Natural and the second is Artificial. Natural such as mountain, forest, river, sea, all the natural element while, artificial was all the element that created by human. On the second perspective which is depend on landscape; the first is softscape and the second was hardscape. Example of Softscape was tree and water body.

Challenges of Urban Park

The initial issue in Malaysia's park is lack of accessibility to green spaces. For example, Kuala Lumpur does not have a proper green network that links to all of the existing open spaces. According to the Kuala Lumpur Landscape Master Plan (2002), the green network which comprises road reserves, river reserves, rail reserves and utility reserves, shows no relationship to each other and there is no green continuity throughout the network.

Criteria on Effectiveness of Urban Park

There are certain criteria required to encourage effective urban park usage. They are comfort, passive and active engagement opportunities, accessibility, and safety (Carr *et al.* 1992).

Comfort

For an open space to be well used, it should provide comfort which create a sense of safety for the users. According to Francis (2003), satisfying needs for food, drink, shelter from the elements, or a place to rest when tired requires some degree of comfort to be satisfied. Without comfort it is more difficult for users to have other needs met according to Whyte (1980). Comfort is in the form of accessibility within the space, including physical access for special needs of children, elderly and by the guidelines of the Americans with Disabilities Act (1990).

Passive and Active Engagement Opportunities

The criteria on effectiveness of urban parks include promoting activities which are passive and active engagement opportunities. Recreational purposes which bear active and passive outdoor activities such as meeting, entertainment, recreation etc., help reduce the stresses of urban life. Aspects such as "amount of public green spaces per inhabitant", "public parks" and "recreation areas" are often mentioned as important factors in making a city liveable, pleasant and attractive for its citizens by Chiesura (2004). McCormack (2010) conducted a study on physical activities in urban parks. They assessed that several features of parks that positively and negatively influence park use. For instance, the presence of playground, sports fields, play equipment's, running tracks, sidewalk paths and the total number of amenities can promote park use and physical activity particularly among children. On the other hand, presence of litter, vandalism, dog faeces and unclean washrooms negatively influenced park use. Their research showed that attributes including safety, aesthetics, amenities, maintenance, and proximity are important for encouraging park use.

Accessibility

Accessibility is a main element for effective public spaces (PPS, 2000). This includes equal access for people of all abilities, and walkability to and from the space with sidewalks and pedestrian crosswalks. Public transit stops should be located near park entrances when possible. Connectedness of the park and surrounding area also affects levels of accessibility. Fences or barriers between the park and surrounding neighbourhood are elements to consider as well as the potential impact on ease of user movement to and from the space. Visual access is important to consider as well. Adequate visibility encourages activity, reduces the uneasy feeling that the park is obscured from the neighbourhood, and creates a sense of continuity between the private yard or porch and the urban park. In this section, urban parks have to be generalized with urban open spaces and parks in general because there are very few studies pertaining only to accessibility of urban parks. This generalization is justified by the broad definition of urban

parks “a public land put aside for public used amidst essentially urban surrounding” that this research uses.

Safety

The ability of a user to enjoy the space to its fullest extent relies on its actual and perceived safety. Feeling unsafe in a park leads to fear, which discourages use even in well-designed urban parks. The perception of an unsafe area is a frequent deterrent of park use. Women, children and the elderly are most dependent on urban parks as a space for recreation and relaxation; yet display the greatest levels of insecurity in parks by Werkele and Whitzman (1995). An effective of urban park must be planned, designed and managed to be a safe space for outdoor use. If the motivation of the park is to invite a variety of users then women, children and the elderly must feel welcome. Werkele and Whitzman (1995) found that approaches to minimizing opportunities for crime and to help park users feel less vulnerable include design changes, increased maintenance levels, provision of security patrols and emergency telephones, and introduction of new activities to generate greater levels of use.

Benefits of Urban Park

Awareness about the importance of urban park towards quality of life has been increasing worldwide. Urban parks and green spaces provide numerous direct and indirect contributions to people’s prosperity, wellbeing, social relations, and daily life experience. Urban parks connect people and these interactions shared spaces are important for strong community engagement and investment. Urban Parks establish and maintain a quality of life in the community, ensure health of users, and contribute to the economic and environmental well-being of a community and region.

Economic Benefits

A well-maintained and planned urban park increases property values adjacent to the space, improves commercial and retail health, and attracts businesses, employees and residents. Private property values increase the closer the space is to urban parks, and this increases tax revenues and improves local economies. Quality parks and recreation are cited as the top reason for business relocation decisions. A study by Nicholls (2004) examining the economic effects of urban parks on property values found that homes facing an urban park have up to a 20 percent value increase, and the residential real estate in proximity to a public park may provide value benefit as high as 33 percent.

Social Benefits

Parks are a *third place*, which according to the American Planning Association (2008), are locations outside of work and home where people seek community. Third places foster casual social interaction that strengthens feelings of belonging, community, and safety. These public spaces also provide specific facilities that attract people and provide social interaction such as the playground, soccer lawn, or water fountain. Parks reflect the quality of life of a neighbourhood. They provide an identity for residents and the given communities create a sense of connection for those who live, work, and play there.

Physical Health Benefits

Urban park programs and facilities promote health and facilitate positive lifestyle choices for children, adults, and seniors. An urban park influences the health of urban residents by encouraging physical activity, providing a place to be in contact with nature, and improving environmental quality, which ultimately improves health. An increasing number of studies have identified positive relationships between urban park and public health (e.g. Takano *et al.* 2002, de Vries *et al.* 2003; Maas *et al.* 2006; Mitchell and Popham, 2007; Nielsen and Hansen, 2007; Annerstedt and Währborg, 2011). These studies relate both to psychological and physical health. Research across the Western world has shown that

access or close proximity to green space, as well as urban park size, have an impact on levels of physical activity (Hillsdon *et al.* 2006). Studies in Japan have indicated that close proximity to urban park motivates people to walk and positively influences the longevity of older people in urban areas (Takano *et al.* 2002), while also reducing mortality rates (Fukuda *et al.* 2004).

Background of Kuala Lumpur City Centre (KLCC) Park

The KLCC Park is a public park located in the vicinity of Suria KLCC, Kuala Lumpur, Malaysia. The park has been designed to provide greenery to Petronas Twin Towers and the areas surrounding it. The park was designed by Roberto Burle Marx. The park was designed to showcase a heritage of tropical greenery by integrating man's creation with nature. KLCC Park is under the control of federal land that has been hand over to Kuala Lumpur City Hall in 1997. The Kuala Lumpur City Hall (DBKL) handed over KLCC Park land to Petroliam Nasional Berhad (PETRONAS) to manage this park as well as maintain the park. Surrounding the KLCC Park there are twenty-three (23) land owner who is responsible for the operation and maintenance of the KLCC Park. KLCC Park is a 50-acre garden set close to Suria KLCC shopping centre. On the park grounds is a 10,000sqm manmade lake (Lake Symphony) with a 43m bridge that cuts across. Besides the various waterfalls, fountains, cascade and reflecting pools scattered around the park, there are a variety of facilities at KLCC Park including a two-acre children's playground, a 1.3km-long jogging track, shelters and benches, patterned footpaths and sculptures. On KLCC Park's western stretch is a public children's swimming pool.

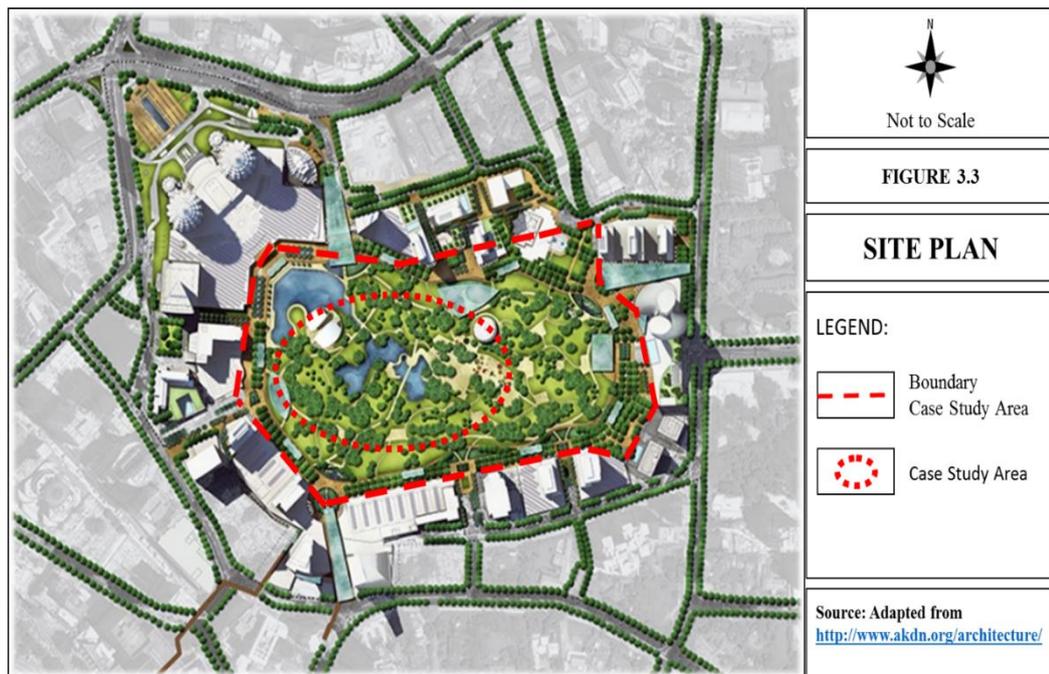


Figure 1: Location Map of Study Area

Population

Population is a group of individuals that share one or more characteristics from which data can be gathered and analysed. Besides that, the act or process of, multiplication of inhabitants is also reviewing the population meaning. According to Veal (2006) population is total categories of the subject which is the focus of attention on a particular research project. The act of populating means that causing to live in a place. Another meaning is (statistics) the entire aggregation of items from which samples can be drawn "it is an estimate of the mean of the population.

This research will refer to the Visit KL website that was created and is managed by Kuala Lumpur City Hall (2011), the population of KLCC Park is estimated approximately 50,000 in new year. Based on the classification of parks in Malaysia by Basri (2011), KLCC Park can be considered as an urban park.

METHODOLOGY

Sample Method

In this research simple random sampling was used to collect the data, which the sampling frame was easily accessible populations (Saunders *et al.* 1997). The samples are visitors picked randomly and everyone within the target populations has an equal chance to be picked as samples. It considers all level of demographic such as gender, age, educations and occupation.

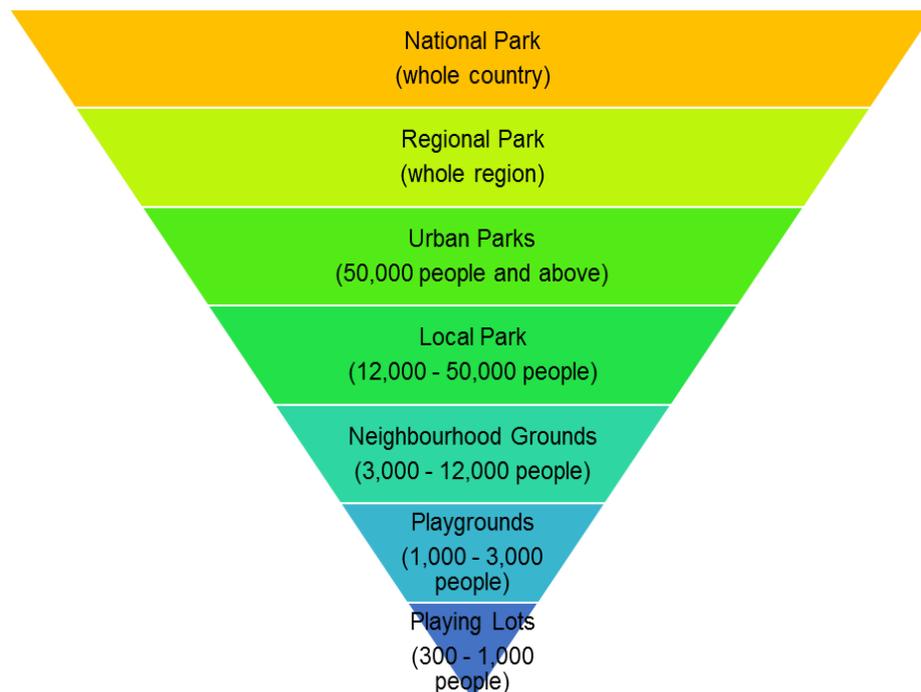


Figure 2: The Hierarchy of Parks in Malaysia (JPBD Planning Guidelines)

Sample Size

This research, simple random sampling (SRS) will be used as the sampling method. SRS is the most basic sampling technique whereby each element is selected by random and is done without replacement, meaning that the research avoids choosing another member in the population more than once (Lim and Ting 2012). This study will refer to the Visit KL website that was created and is managed by Kuala

Lumpur City Hall (2009), the population of KLCC Park is estimated approximately 50,000 in new year therefore each sample has to possess an element that represents an entire population. According to Kothari (2009), SRS technique ensures that any chosen average random sample will have the same composition and characteristics as the universe. Sample size that determine was 320 respondents as sample size.

ANALYSIS

Table 1 shows the demographic profile of the respondents surveyed in this study. Based on the table, the distribution of males was 43.4 and females 56.6% from 320 respondents.

Most of the respondent were aged 21-30 years old (95.3%) followed by the age of 30-40 years old (3.8%) followed by respondents aged below 20 years old (0.9%). Respondents' occupation includes students, private sector, government sector and self-employed. Student represent the highest number of respondents (53.8%) followed by those working at private sectors (31.3%). This is followed by the third highest number of respondents from the government sector with 45 respondents or 14.1%. Other respondents are self-employed (0.9%). From the survey the respondents(visitors) came to KLCC Park for some purpose which are education, research or recreation purpose such as meeting people, shopping or business.

Table 1: Demographic Profile of Respondents

	Variable	Frequency (N)	Percent (%)	Total	Percent (%)
Gender	Male	139	43.4	320	100
	Female	181	56.6		
Age	Below 20 Years Old	3	0.9	320	100
	21 – 30 Years Old	305	95.3		
	30 – 40 Years Old	12	3.8		
	41 – 50 Years Old	0	0.0		
	51 Years and Above	0	0.0		
Academic Level	Primary Education Level	0	0.0	320	100
	Secondary Education Level	1	0.3		
	Certificates/STPM/Diploma	149	46.6		
	Bachelor and Above	170	53.1		
Occupation	Student	172	53.8	320	100
	Private Sector	100	31.3		
	Government Sector	45	14.1		
	Self-Employed	3	0.9		
Race	Malay	175	54.7	320	100
	Chinese	97	30.3		
	Indian	48	15.0		

Criteria on Effectiveness of Urban Park

The questionnaire distributed to respondents had several questions to gauge the effectiveness of the urban park being studied. Each of the answer can be evaluated based on the selection level of agreement scale in Table 2.

Table 2: Answering Scale

Strongly disagree	Disagree	Neutral	Agree	Strong agree
1	2	3	4	5

According to Reynold, D. G. (2007) the likert-type scale can be stated accordingly by scale followed by the average mean as the table below.

Table 3: Mean Scale

Scale of Mean	Answer
1 – 1.49	Strongly disagree
1.50 – 2.49	Disagree
2.50 – 3.49	Neutral
3.50 – 4.49	Agree
4.50 – 5.00	Strongly agree

The criteria of an effective urban park have been determined by the characteristics identified from previous researchers (Carr *et al.* 1992, Whyte, 1980 and Francis, 2003). In this study, the highest mean pointed to the element of comfort with a 4.21 mean scale. This element indicates the respondents agree that the park has a variety of space for seating and relaxing and that the park has good maintenance. The highest percentage of respondents (72.2%) agrees to this characteristic as being present. A comfortable park includes comfortable seating, and variety of spaces for seating and relaxing (Francis, 2003). Factors such as a good first impression of the park, the use of appropriate materials, activity areas' complying with the standards the presence of sufficient and ergonomic seating, use of water, shelter against bad weather, presence of park management and others affect the effective of urban park (PPS, 2001).

The second highest characteristic of an effective urban park indicated by the mean score of 4.03 is *active engagement opportunities*. A majority of respondents (65.3%) or 216 respondents agree that the KLCC Urban park has provision for active recreational opportunities such as pedestrian walkways.

The third highest mean in the criteria of an effective urban park is *accessibility* with the mean scale of 4.03. The majority of the respondents (65.95%) or 211 respondents agree that there is easy access to the park by means of passenger bicycle, public transportation vehicles and private vehicles; there is clear signage and activities are easy for visitors to locate. This permits visitors to navigate the park and easily find various locations, thereby positively affecting visitor perceptions of accessibility, safety and increasing usage of the park. Lynch and Carr (1965), PPS, (2000).

The lowest mean in the criteria of an effective urban park is 1.95 as indicated in the scale of mean. The highest percentage of respondents (39.1%) strongly disagree followed by 35.01% of respondents which is (39.1%). Next, second highest which is disagree (35.0%) that the park provides sufficient lighting and secures appropriate elements. Feeling unsafe in a park leads to fear, which discourages use even in well-designed public parks. The perception of an unsafe area is a frequent deterrent of park use during night time. According to Werkele and Whitzman (1995). Women, children and the elderly are most dependent on urban parks as a space for recreation and relaxation; yet display the greatest levels of insecurity in parks. An effective urban park must be planned, designed and managed to be a safe space for outdoor use. If the motivation of the park is to invite a variety of users then women, children and the elderly must feel welcome.

Table 4: The Criteria of an effective Urban Park

The criteria of an effective urban park	Percent (%) / Frequency					Mean	Total Mean
	Strong disagree	Disagree	Neutral	Agree	Strongly Agree		
Criteria of Comfort							
a. The park has a variety of space for seating and relaxing	-	11	-	231	78	4.18	4.21
	-	3.4%	-	72.2%	24.4%		
b. The park has good maintenance	-	5	4	220	91	4.24	
	-	1.6%	1.3%	68.8%	28.4%		
Criteria of Activities							
Passive Engagement Opportunities: Types of Passive Activity							
c. The park provides area of relaxation	1	1	33	198	87	4.15	4.02
	0.3%	0.3%	10.3%	61.9%	27.2%		
d. The park provide place for reading activities	5	16	75	192	32	3.72	3.96
	1.6%	5.0%	23.4%	60.0%	10.0%		
e. The park provide place for seating area	1	3	30	191	95	4.18	
	0.3%	0.9%	9.4%	59.7%	29.7%		
Active Engagement Opportunities: Types of Active Activity							
f. The park offers visitors to do sport activities	1	12	19	216	72	4.08	
	0.3%	3.8%	5.9%	67.5%	22.5%		
g. The park provides walking area for pedestrian	-	-	14	209	97	4.26	4.17
	-	-	4.4%	65.3%	30.3%		
Criteria of Accessibility							
h. The relationship between public transportation station and the park is very good	-	4	43	211	62	4.03	4.03
	-	1.3%	13.4%	65.9%	19.4%		
Criteria of Safety							
i. The park has sufficient lighting and secure appropriate elements	125	112	57	26	-	1.95	1.95
	39.1%	35.0%	18.1%	8.1%	-		

The Benefits of Urban Park towards Visitors

Based on the survey of this study, there are several of benefits which can be obtained by the visitors to Kuala Lumpur City Centre (KLCC) Urban Park. The majority of the respondents agree that the urban park offers opportunities for visitors to gain physical health benefits. The mean value of 4.21 was the highest among the other average scales. Environmental benefits followed with an average score of 4.18. This is indication that respondents agree that the urban park can help reduce air and noise pollution of that area.

The physiological health benefits scored a mean average of 3.85 which corresponds to the respondent's belief that urban park does have benefit in improving psychological feelings including reverie from illnesses. Several studies have identified positive relationships between urban park and public health (Takano *et al.* 2002, de Vries *et al.* 2003; Maas *et al.* 2006; Mitchell and Popham, 2007; Nielsen and Hansen, 2007; Annerstedt and Währborg, 2011). These studies relate both to psychological and physical health. Studies in Japan have indicated that close proximity to urban park motivates people to walk and positively influences the longevity of older people in urban areas (Takano *et al.* 2002), while also reducing mortality rates. In Denmark, close proximity to and resulting use of green space was found to help young people overcome obesity problems (Nielsen and Hansen, 2007). Furthermore, a study by Biddle *et al.* (2004) supports the assertion that people who regularly participate in exercise in urban park are less prone to obesity and have better bone condition, thereby reducing the risk of developing osteoporosis. Contact with nature reduces stress levels. Reducing mental fatigue lowers frustration, tension, and irritability levels. The interaction with nature that parks provide, "gives the mind an opportunity to recover" according to Kaplan and Kaplan (1998). The natural elements found in urban parks improve water quality, clean the air, provide vegetative buffers to development, provide a habitat for wildlife, and allow users a place to connect with nature.

Economic benefits of urban parks towards visitors scored the lowest mean scale of 3.71 which indicates that respondents agree that the urban park does offer economic benefits to the commercial and retailers within the area. According to Nicholls (2004) the economic effects of parks on property values found that homes facing a neighbourhood park have up to a 20 percent value increase, and the residential real estate in proximity to a community park may provide value benefit as high as 33 percent. While the effects are contingent upon variables, including maintenance, safety, visibility, noise and congestion by park users, and accessibility, it is clear that the proximity to an urban park has an effect on the economic health of a community. A well maintained and planned park increases property values adjacent to the space, improves commercial and retail health, and attracts businesses, employees and residents. Private property values increase the closer the space is to parks, and this increases tax revenues and improves local economies.

Table 5: The Benefits of Urban Park towards Visitors

The benefits of urban park towards visitors	Percent (%) / Frequency					Mean	Total Mean
	Strong disagree	Disagree	Neutral	Agree	Strongly Agree		
Economic Benefits							
a. Urban park can improve commercial and retail condition	-	18	82	199	21	3.70	
	-	5.6%	25.6%	62.2%	6.6%		
b. Increases employment opportunities	-	17	92	185	26	3.69	3.71
	-	5.3%	28.8%	57.8%	8.1%		
c. Private property values increase	-	7	95	189	29	3.75	
	-	2.2%	29.7%	59.1%	9.1%		
Social Benefits							
d. Urban park contribute to the social health	-	4	21	159	136		
	-	1.3%	6.6%	49.7%	42.5%	4.33	
e. Urban park can reduce level of crime	1	27	183	105	4	3.26	3.86
	0.3%	8.4%	57.2%	32.8%	1.3%		
f. Urban park offer social interaction	-	-	61	199	60	4.00	
	-	-	19.1%	62.2%	18.8%		
Physical Health Benefits							
g. Urban park promote positive lifestyle	-	-	21	174	125		
	-	-	6.6%	54.4%	39.1%	4.33	
h. Urban park offer space for physical activity	-	-	23	196	101		
	-	-	7.2%	61.3%	31.6%	4.24	4.21
i. Reducing emotional stress level	-	3	41	210	66	4.06	
	-	0.9%	12.8%	65.6%	20.6%		
Environmental Benefits							
g. Urban park helps to maintain a healthy urban environment.	-	-	-	171	159		
	-	-	-	53.44%	49.7%	4.5	
h. Urban park improves air quality.	2	9	-	276	33		
	0.63%	2.81%	-	86.3%	10.3%	4.03	4.18
i. Reducing noise pollution from traffic and in controlling temperature.	2	16	-	264	38	4.0	
	0.6%	5%	-	82.5%	11.9%		
Psychological Health Benefits							
g. Reduce blood pressure.	-	9	-	277	34		
	-	2.8%	-	86.6%	10.6%	4.05	
h. Recovery from illness.	5	28	-	274	13		
	1.6%	8.8%	-	85.6%	4.1%	3.82	
i. Urban Park can reduce pressure and enhances job satisfaction.	6	42	29	218	25		
	1.9%	13.1%	9.1%	68.1%	7.8%	3.67	3.85

CONCLUSION

It is important to understand how urban park have become more important as a result of urban migration and rapid urbanization. The findings of this study should be applied to all park and open space systems in the city of Kuala Lumpur. The green space planning and management of the park is the main factor to ensure the park is functioning well to the visitor. The finding of criteria on effective of urban park can be applied to any urban park to serve the visitors positive benefits regarding develop skill mental and physical.

Further research must explore these criteria, consider whether they are relevant, and explore their implications for park and open space design in Malaysia. However, it is important to understand that the criteria vary from place to place.

The urban park can be beneficial to the visitors. Based on the finding, most of the respondents agreed that urban park can give more benefits to the visitors. Urban parks provide natural environments that help overcome urban stress and thus play an important role in increasing the quality of urban life. Assessment of the effective of such places depends on sensorial, emotional and mental relationships between the users and the environment.

The finding result show that the main benefits of urban park is health and physical benefits whereby urban park promote positive lifestyle, offer space for physical activity and reducing emotional stress level. To maintain the quality urban park, it should implement a maintenance and management plan. Parks that have management plan in place, and in which regular maintenance and repairs are carried out, are high-quality places where the users feel comfortable and safe. To encourage visitors to get benefit towards the urban park a variety of programs and activities need to be organized. Urban park needs to be maintained well for present and future generations to be able to enjoy the advantages and benefits. It is very important in increasing the quality of life of people especially in urban area.

The finding in term of planning and management of the park can conclude that urban planners and green space managers need to ensure that green spaces meet the demands and preferences of visitors. For this purpose, it is important to carry out surveys, interviews, focus group interviews, observational studies and the like, so that more in-depth insight is acquired on people's behaviour, demands and preferences. This study has indicated that this type of knowledge is often still lacking in Malaysia. Institutional structures are important for sound green space planning and management. In particular, efficient and well-informed planning and management can help improve green spaces and meet users' needs. However, the local authorities included in this study identified a lack of resources as a major problem for green space planning and management. New sources of funding and better central government advocacy and policy are needed to support green space within cities.

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Shipping Container Counting Approach Using Unmanned Aerial Vehicle (UAV) And ArcGIS

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ABSTRACT

In Malaysia, the existing of counting approach on the shipping container at depot is carried out by manual based system. This has made the efficiency of the method to be questioned which can be solved through automation. Under previous studies, Unmanned Aerial Vehicle (UAV) is demonstrated for automatic counting of cars and trees. Therefore, the possibility for shipping container counting is highly required in which promotes low-cost alternative and automated-pilot for data collection. Based on this study, the aerial images captured using UAV is combined with geographical information processing software, ArcGIS, towards automated approach for container counting. The overlapping aerial images are post-processed using photogrammetric technique to produce Digital Surface Model (DSM) that represents the ground and above surface feature's elevations. Then, the constructed DSM is filtered to develop Digital Terrain Model (DTM) where it represents the ground surface's elevation only. Then, container's candidates are isolated using subtraction of the DTM from DSM to generate normalized DSM (nDSM) which represents the heights of container's stacks. From the standard size and height of one container from ISO, the number of containers is extracted. The ModelBuilder tool available in ArcGIS is customized for automated geographical information processing. From results, the proposed approach contributed to 100% of counting accuracy.

Keywords: *Unmanned Aerial Vehicle, Counting, Shipping Container, ArcGIS, ModelBuilder*

INTRODUCTION

Malaysia's primary container ports, Port Klang is ranked as the 12th largest and busiest port terminal in World Container League year 2015 due to the massive growth in shipping container handling each year (StarBiz, 2017). From the report by Port Klang Authority's Official Portal (2018), the increasing numbers of container is about 11% with total of 13.17 million Twenty-foot Equivalent Units (TEUs) registered in year 2016 compared to 11.89 million TEUs in 2015 (Port Klang Authority, 2018 & StarBiz, 2017). In order to stay competitive with other countries container ports, Malaysia's port must be improved in term of performance in management system and provide the most economical ways (Nazery, 2012).

At the container terminal in Malaysia, it has been found that the counting approach on the number of shipping container is still incomprehensive and inefficient way which made the current system is labour intensive and impossible for validation especially in the case of a large number of containers. Under previous studies, the delay in customs clearance at Mombasa port is caused by lack in IT integration (Nyema, 2014). Furthermore, the decreasing in production performance in container terminal has been analysed using Stochastic Frontier method and found that it is mostly due to lack in technical efficiency (Liu, 2010). Aside from an analysis that has been carried out using Data Envelopment

Analysis (DEA) in order to analyse the technical inefficiency in Middle Eastern region' container terminal, it can be concluded that the factors involved are implications from operational time, labour, berth occupancy and the operational performance of cranes (Almawsheki & Shah, 2015).

Therefore, the inefficiency of the current counting approach on shipping container is able to be described in terms of time, cost and technical aspects. By improving the aspects, the performance of the container counting method can be improved significantly. The integration of automation is being considered that enable to improve the efficiency of the overall system's performance in container terminal operations (Sadeghian *et al.*, 2014). The examples are seen from previous research made related to container terminal that include automation of gates, quay cranes and yards (Martín-Soberón *et al.*, 2014). Researchers have demonstrated an automated approach of counting based on Unmanned Aerial Vehicle (UAV); the automatic counting approach of car (Moranduzzo & Melgani, 2014) and palm trees (Bazi *et al.*, 2014). Both concepts have shown promising results based on the combination of UAV captured images and geomatics concept. Due to this, the intent of this research is to study the possibility and capability of UAV and geomatics concept for the counting application on the shipping container.

Nowadays, the application of UAV is considered a low-cost alternative, time-saving and high-flexibility (Anuar *et al.*, 2013 & Khairul, 2015). It can be applied by collecting the data in form of image that contains the shipping container's stacks. Specialized and sophisticated software is used to post-process the images through several phases until the number of containers are extracted accurately. Agisoft Photoscan (Agisoft, 2018a) software is suitable to post-process the images with using photogrammetric technique (Agisoft, 2018b, Saikia *et al.*, 2010, Venkatramaiah, 2011 & Natural Resource Canada, 2016) to produce digital elevation models and orthophoto. From study, Agisoft software has demonstrated to be able to produce digital elevation model with expected accuracy within centimetre-level (Tokunaga & Uysal *et al.*, 2015).

The Digital Elevation Models to be produced are Digital Surface Model (DSM) and Digital Terrain Model (DTM). The DSM is a model that comprises of ground elevation as well the above-ground feature's elevation such as building and trees (Gomasasca, 2009). As for the DTM, it only represents the ground elevation (Gomasasca, 2009). Aside from that, another product developed through the photogrammetric technique is the orthophoto, which represents RGB image with corrected for its scale and orientation (Barazzetti *et al.*, 2014 & Paine & Kiser, 2012, Greer, 1994).

Additionally, ArcGIS (Esri, 2018) is used where it is a geographical information software that specialized in geographical information processing. In ArcGIS, a tool called ModelBuilder (Esri, 2017) is used to be customized for generating the number of containers automatically as possible. With using ArcGIS, the DTM subtracted from the DSM to generate the normalized DSM (nDSM) (Abdelguerfi, 2012), which represents the isolated container's candidates from ground surface. This is used together with orthophoto to be geographically processed until the number of containers are extracted accurately.

In this study, combinations of UAV and ArcGIS are applied to propose a new approach of accurate shipping container counting.

RESEARCH BACKGROUND

Currently, the counting approach on the shipping container in Malaysia is carried out by manual based system (Hashim, 2017). From this study, it has been found that situation of the depot is making the current approach to be considered labour intensive and absurd, primarily for the case that involved a large number of shipping containers. For example, the large size of the terminal, many unreachable spaces between the rows of container stacks, heavy machineries continuously operate in and out, have made the factors of operational efficiency to be questioned. Referring to the report that has been generated from Port Klang Authority's Official Portal (2018), there are increasing growth of Twenty-foot Equivalent Units (TEUs) in Port Klang from year 2005 to 2017 as shown in Figure 1.

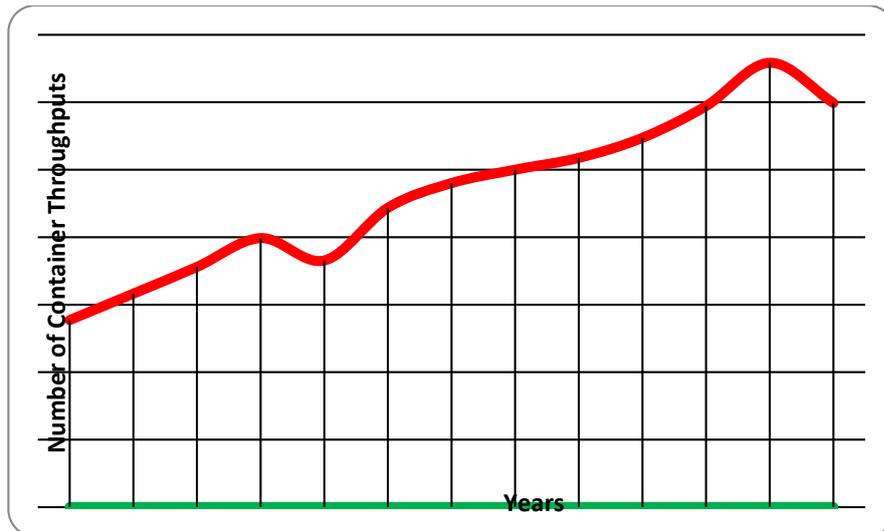


Figure 1: Number of Container Throughputs in Port Klang Year 2005 to 2017.
Source: (Port Klang Authority, 2018)

Jeevan et al., (2015) has mentioned that from his findings, dry ports or depots are container terminal that developed to accommodate high volume of containers without the needs of unnecessary investment towards seaport's enlargement. However, an economical and efficient approach are required to support the huge number of containers to be handled by seaports as well coping with the strategy of improving the operational efficiency of container management at depots. Therefore, Malaysia's container ports management performances must be gradually improved to continuously provide the most economical system in order to retain clients, attracting new users, attracting new investments and maintaining overall competitiveness (Nazery, 2012).

From the issues, in maintaining the overall competitiveness between ports, a new approach for the shipping container counting is proposed using combination of Unmanned Aerial Vehicle (UAV) photogrammetric technique and geographical information processing. This leads with objective to produce the model of container from the approach and finally assessing the accuracy obtained. This study will promote an integration of automation into the existing approach.

METHODOLOGY

The methodology of this study is described on Figure 2, where it comprises of 3 main phases. Phase 1 for studying the factor of inefficiencies in the current container counting approach practices in Malaysia; Phase 2 to deploy the UAV in order to collect the images data and post-process to produce Digital Terrain Model (DTM), Digital Surface Model (DSM), Orthophoto; and Phase 3 is to geographically process the inputs as to generate the number of container and then finally to assess the accuracy.

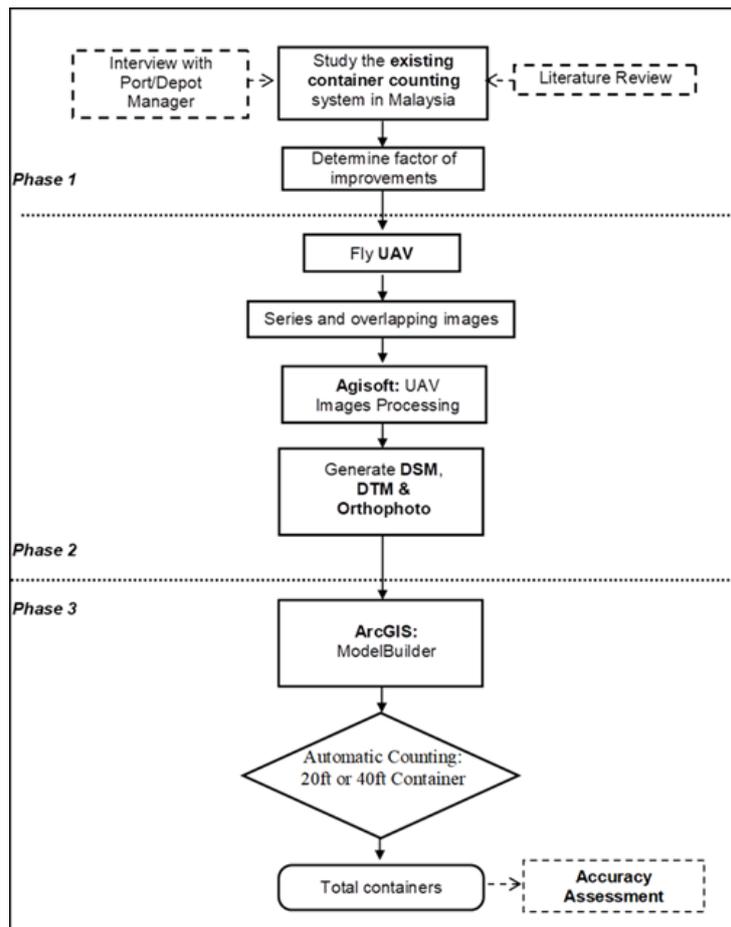


Figure 2: General Methodology flowchart

Phase 1 Preliminary Study and Problem Identification

The study of the inefficiency factors of the current practices of shipping container counting in Malaysia are done by interview session and reviewing with the container terminal operation manager and previous studies respectively. It has been found that the aspects of technical (Liu, 2010 & Almahsheki & Shah, 2015), safety (Sunaryo & Hamka, 2012), cost (Nazery, 2012), time (Nyema, 2014) and sustainability (Kang & Kim, 2017) are required and to be considered for proposing the future counting approach.

Phase 2 Data Collection and Images Processing

The Phantom 4 Pro is being used that fitted with high resolution digital camera and integrated with GPS on board, so that the image is geographically tagged. The study begins with the configuration of flight planning parameters with using smartphone apps before the deployment of the UAV in order to ensure that the flight mission of the UAV is always according with the requirements of the work. This includes locating and defining the size of the covered area, the starting point and end point, the flight path, the flight altitude from the hovering ground and the percentages of overlap images.

The study area of the shipping container depot is located at Port Klang, Selangor with about 13 acres in size. For the creation and generation of the three-dimensional data, the aerial images are captured in series and overlapped based on photogrammetric technique (Natural Resource Canada, 2016; Venkatramaiah, 2011 & Saikia et al, 2010). This is shown in the Figure 3.

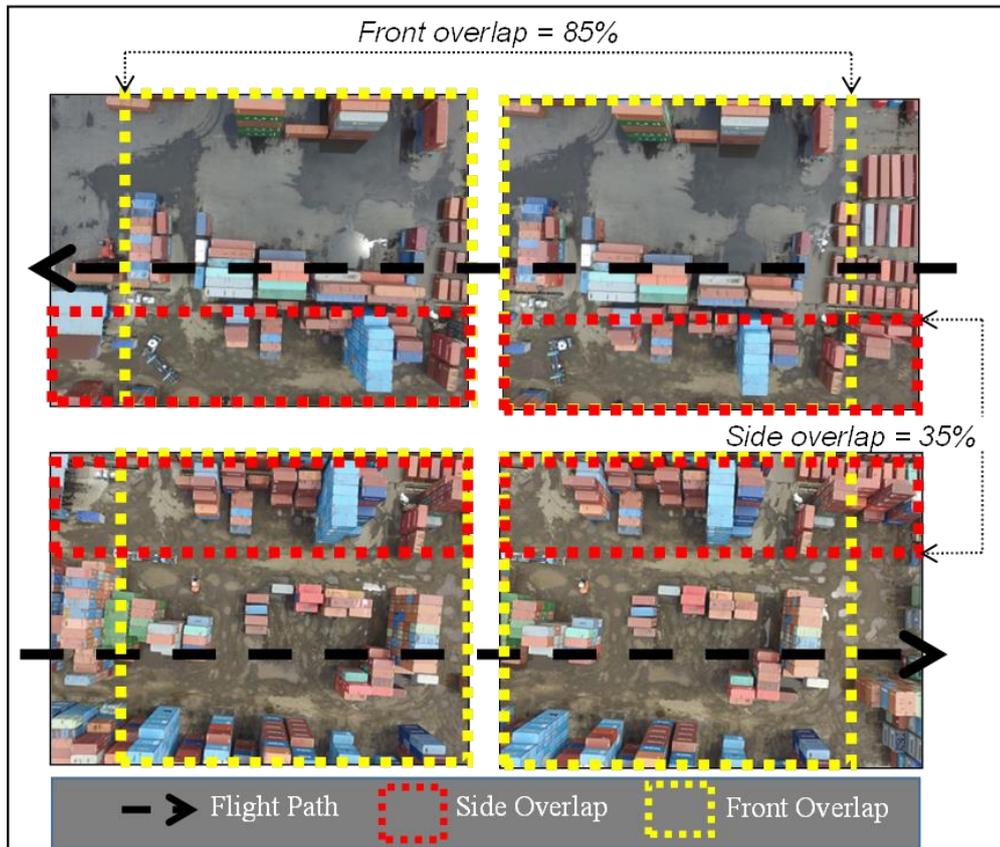


Figure 3: The configuration of overlapped images

Based on Figure 3 above, flight altitude for UAV is set to 70 meters (223 feet) above ground level (AGL), the overlap percentages between consecutive aerial images are set to 85% for frontal overlap and 35% for side lap. High overlap percentages are recommended for UAV photogrammetry based on previous studies where it is to overcome wind effect that could deviate the flight path and orientation of the images, as well to provide a stable imaging towards quality outputs (Raczynski, 2017; Yang, Lin, & Liu, 2016; Wang, 2013 & Xing et al., 2010). The collected images data are then post-processed using specialized photogrammetric technique integrated software, Agisoft Photoscan (Agisoft, 2018a & 2018b) to generate digital elevation models, the DSM and DTM (Gomasca, 2009). For the next process, the captured images are first added into Agisoft software. Then, the images are aligned based on geographically tagged coordinates X, Y and Z from UAV's GPS.

Simultaneously, it performs image matching based on the overlap percentages between consecutive images. Next, it continued with the creation of dense point clouds from the distribution of coordinates to the unknown points that interpolated from the known coordinates. After that, the step proceeds to build digital elevation models (DEM) and the orthophoto in which the outputs are exported in GeoTIFF format for further uses in ArcGIS software. The relationship between DSM, DTM and orthophoto are described in Figure 4.

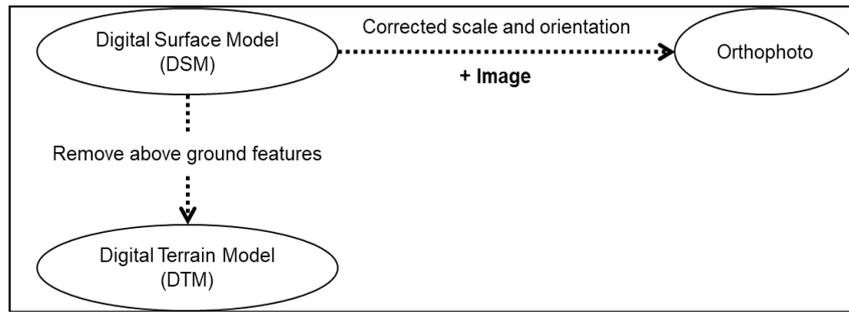


Figure 4: Relationship of DSM to DTM and Orthophoto

In Figure 4, the orthophoto is created based on images and DSM data produced beforehand. As for the DTM, it involves the filtration of above ground features elevations from the DSM. Figure 5, Figure 6 and Figure 7 show the 3D models that have been developed using Agisoft software.

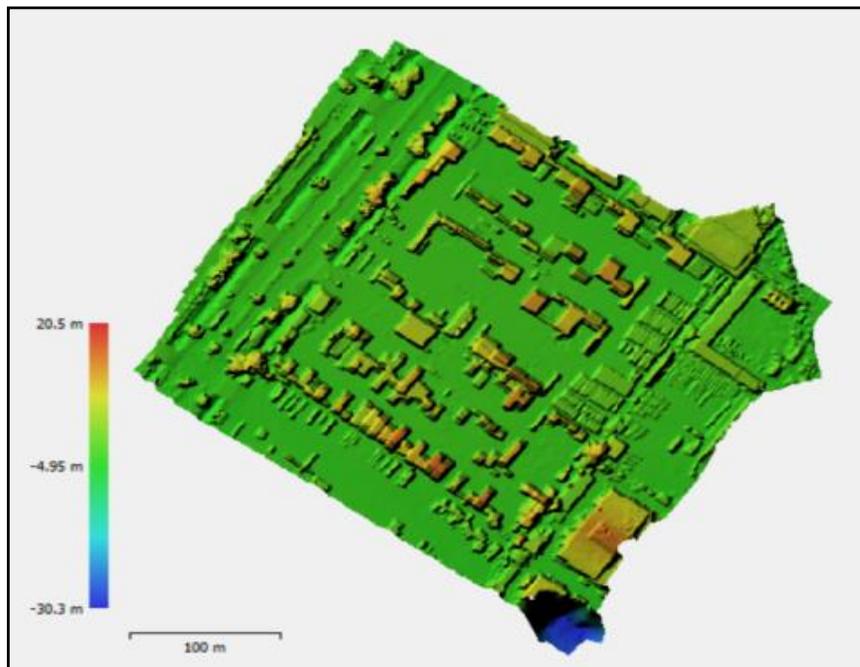


Figure 5: Digital Surface Model of container's stacks

Figure 5 shows the Digital Surface Model (DSM), which is a three-dimensional model that represents the elevation of surface which includes feature (container's stacks) above the surface while Figure 6 represents the Digital Terrain Model (DTM) that was produced from the DSM.

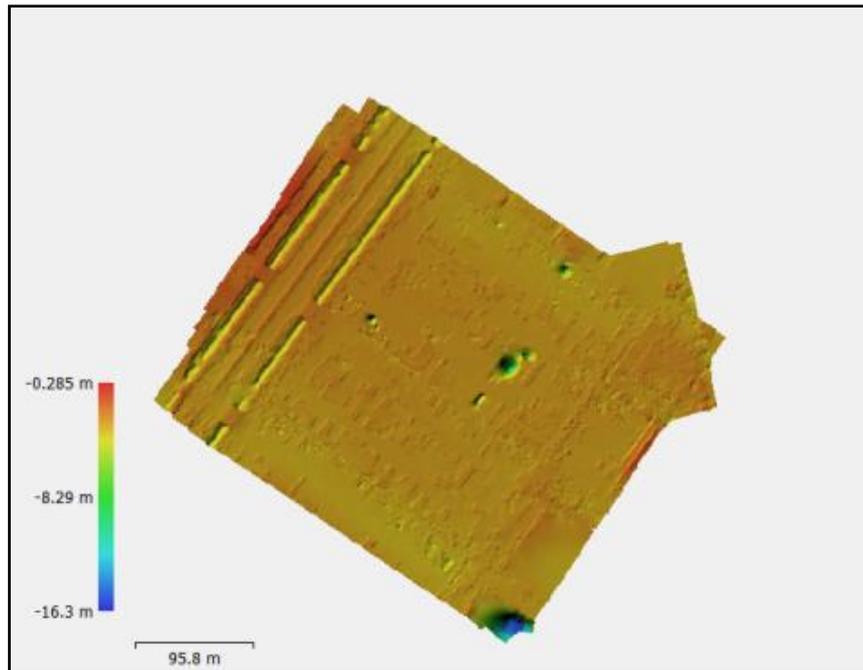


Figure 6: Digital Terrain Model of container's terminal area

Based on Figure 6, the Digital Terrain Model (DTM) produced is also a three-dimensional model but only represents the ground elevation (container's terminal area) where the above surface's feature elevations are removed from the DSM. Figure 7 shows the orthophoto in the area of interest that also developed using Agisoft software.



Figure 7: Orthophoto of container's terminal area

In Figure 7, the orthophoto is the RGB image that has been corrected for its scale and orientation (Barazzetti *et al.* 204; Paine & Kiser, 2012 & Greer, 1994) of the depot or container's terminal. These three output models are used as inputs to be geographically processed in ArcGIS (Esri, 2018) software for the next phase.

Phase 3 Geographical Processes and Accuracy Assessment

The geographical processing task involves the filtration process to extract the container stacks then extraction of number of containers which carried out in ArcGIS software. This includes the subtraction of DTM from DSM to produce normalized Digital Surface Model (nDSM) (Abdelguerfi, 2012) which is shown in Figure 8.

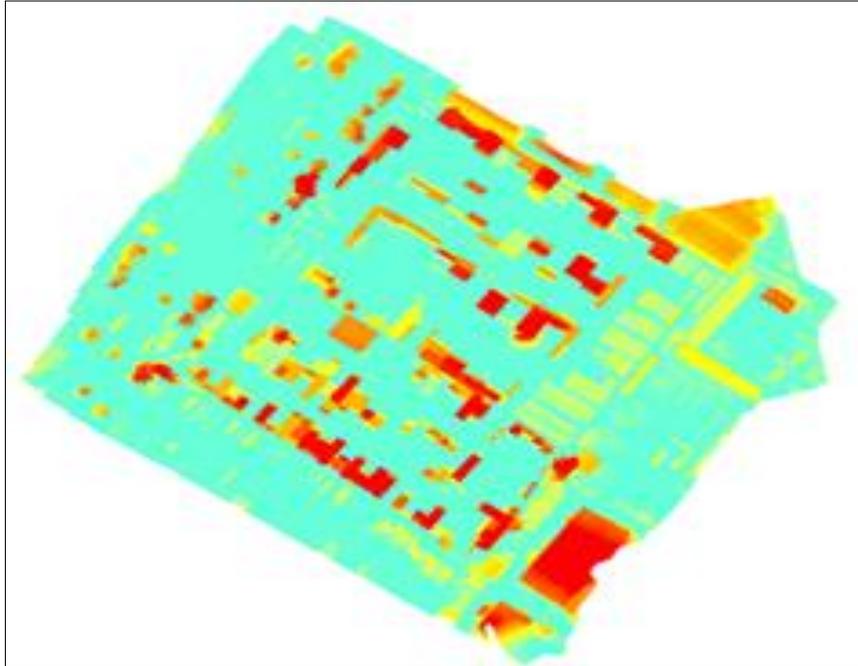


Figure 8: Normalized DSM (nDSM) of Container's Stacks

Based on Figure 8, the nDSM represents only the container's stacks heights with zero (0) value for the ground elevation. The elevation is displayed in color-coded where cyan colour indicates zero (0) value and the yellow to red indicates the container stacks heights from low to high elevation respectively.

Using the nDSM, a few of filtration processes is carried out to remove unwanted entities and to select container stacks candidates for the further assessment. This involves heights classification and conversion of the data into polygon that represents the container stacks model that allows computation to be customized based on equation (1).

$$\frac{\text{Total Size of Container}}{\text{Standard Size of Single Container}} = \text{Number of Container} \quad (1)$$

Finally, the accuracy of the counting using the system is assessed by comparing with the number verified on-site. Using the International Standard Organization (ISO) 6346:1995 which define the standard size of a container for 20 feet and 40 feet (Lowe, 2006), the number of containers can be counted from the total area and total height modelled. The ModelBuilder tool available in ArcGIS is then customized so that the counting process can be automatically run for another shipping container stacks candidates where it is useful for any repetitive tasks (Hidayat & Andajani, 2018).

RESULTS AND DISCUSSION

Due to the limitations of the system, the different types of 20 feet container and 40 feet container are unable to be counted together. Therefore, the automated counting system is developed into two different types of shipping container counting tools using the ModelBuilder: 20 feet container counting tool and

40 feet container counting tool. Figure 9 and 10 show the 20 feet and 40 feet container stacks modelling based on number of stacks. Figure 11 and 12 show the container stacks outputs for 20 feet and 40 feet container modelling.

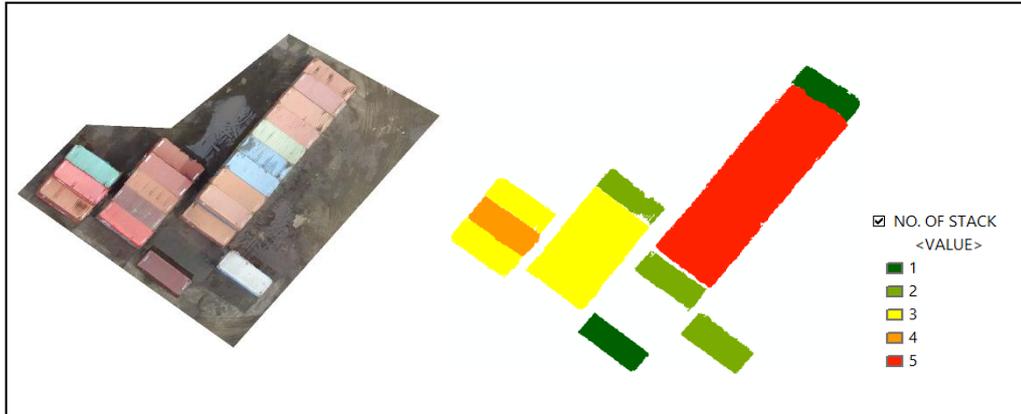


Figure 9: Containers (20 feet) Stack Modelling

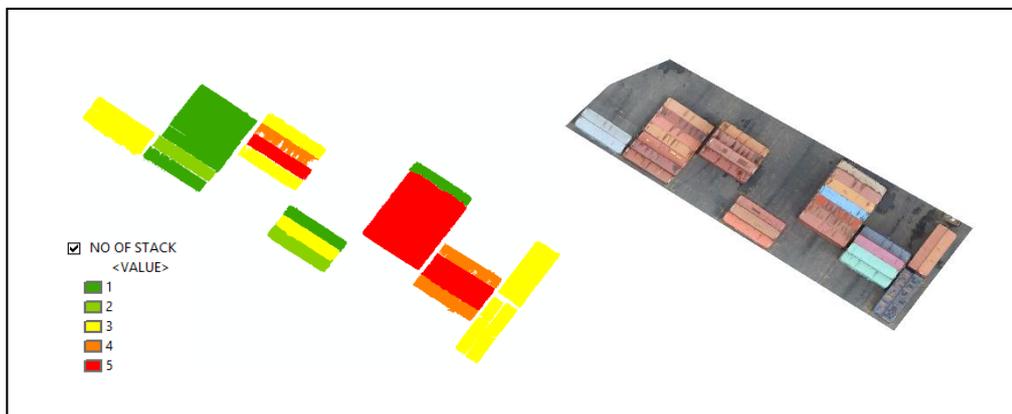


Figure 10: Containers (40 feet) Stack Modelling

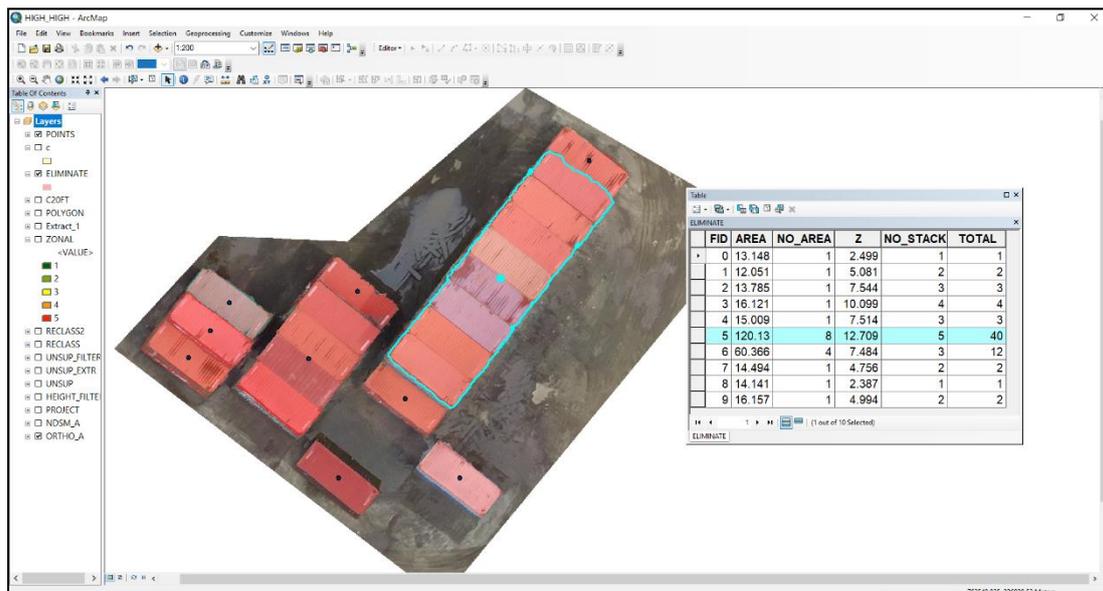


Figure 11: Shipping Container (20 feet) Counting Results

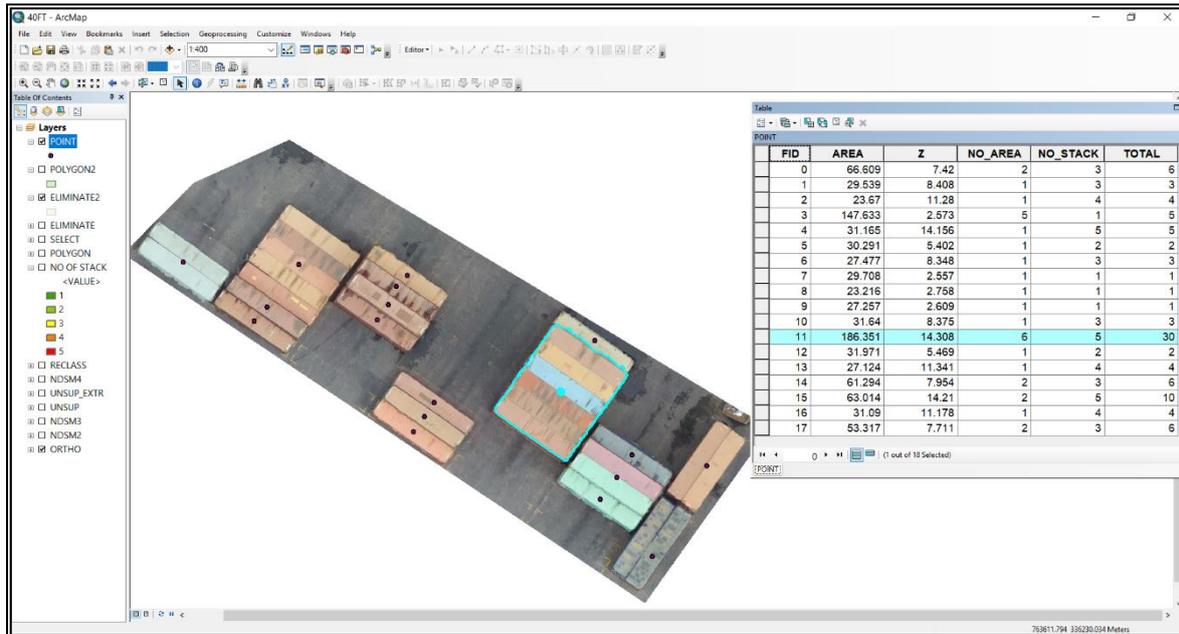


Figure 12: Shipping Container (40 feet) Counting Results

Figure 12 shows the numbers of containers counted are displayed in form of number per area (NO_AREA) and number per stack (NO_STACK) relatively. Additionally, total number of containers is computed based on the multiplication of both number per area and number per stack and displayed (TOTAL). For the counting accuracy assessment, there are 70 containers of 20 feet and 96 containers of 40 feet verified on-site based on manual counting. From the outputs, the accuracy assessment result is tabulated in Table 1.

Table 1: Shipping Containers Counting Accuracy Assessment

Container's Length Type	Total Number Verified On-site (A)	Total Number Counted using Proposed Approach (B)	Counting Accuracy (%) [(A/B) x 100%]
20 feet	70	70	100
40 feet	96	96	100

From Table 1, it is found that the counting accuracy of the system developed achieved 100% for both 20 feet and 40 feet shipping container counting. This is proven by comparing the total number through the on-site verification with the total number counted using the proposed system.

CONCLUSION

The combination of UAV and ArcGIS have made the entire existing shipping container counting task at the depot or container terminal to be automated as well contribute to 100% of counting accuracy. The integration of automation towards the shipping container counting approach will significantly improve the pace of the operation as well mitigating the worker risks in the continually busy environment related to the container's management. Therefore, it supports in increasing the efficiency of the shipping container management.

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Improving the Equity Component of the Lagos State Land Use Charge (2018) for Enhanced Property Tax Yields

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ABSTRACT

Property tax has remained a subject of recurrent debate amongst policy makers, scholars, public officials, real estate valuers, and other stakeholders, virtually everywhere over the years. The contention centres on issues such as the tax base, tax incidence, efficiency, and particularly, equity or fairness, among others. Qualities like ease of collection, difficulty of avoidance, accountability, and transparency etc., that ordinarily mark out property tax as a good tax in principle, are often compromised by controversial policies and mal-administration, particularly the latter. The new Lagos State Land Use Charge 2018 (LUC, 2018) came into force effective January, 2018. In a similar version that its immediate predecessor, the Land Use Charge 2001 (LUC, 2001), attracted spontaneous and widespread protests on promulgation, the criticisms and protests that greeted the passage LUC (2018) has been vehement and remained unabated until the government was forced, like it did with the erstwhile law, to succumb to substantial but arbitrary reductions in rates and allowances across board (at two different times to date) but without a formal amendment to the law; an exact replica of what transpired under the erstwhile law and which opened it to abuse and arbitrary implementation with its compliance and revenue yields implications. The last of these reductions which took place in August saw a whopping 50%, and 25% cut in assessed rates on commercial properties and industrial properties, respectively. This study employed the doctrinal research methodology whereby the valuation or assessment aspect of the LUC (2018) was diagnosed with a view to finding amicable resolutions to the equity problem that virtually crippled the effectiveness of LUC (2001) over its seventeen years of existence and is already threatening the survival of the new LUC (2018).

Keywords: *assessment criteria, equity and fairness, Land Use Charge (2018), property tax.*

INTRODUCTION

Property tax is an annual tax on real property. It is usually, but not always, a local tax. Property tax has been in existence for at least three millennia. It is common throughout the world and has often been the subject of political debate. At the local government level, property taxes can be considered one of the most popular options for raising revenue for financing public services. In this context, property taxes are defined as an annual tax on land and buildings. Some well-known characteristic of property taxes perhaps account for its universal popularity in integrating taxation systems. Among others, property tax is considered easy to understand and enforce. It is cheap to collect and administer, difficult to evade, capable of producing a large and predictable yield, and easy to allocate to a particular local authority in terms of revenue. In addition, it represents a familiar concept to local administrators as well as taxpayers. Furthermore, property tax is a tool for encouraging local democracy while allowing the public sector to derive shares of private sector windfall gains from public investment in infrastructure (Slack, 2013). A well-executed property tax system ensures a stable revenue source for local administration that enables a long-term provision of essential services (Lincoln Institute of Land Policy, 2017).

In spite of its widely acknowledged revenue generation potentials, property tax has not yielded appreciable revenue in most countries, particularly in developing countries, Nigeria inclusive. The World Bank (1995) described property tax as the largest untapped potential source for municipal infrastructure in Nigeria. Ali, Fjeldstad & Katera (2017) reported that in many African countries, property taxes raise revenue far less than 0.5% of the gross Domestic Product (GDP) against over 2% average in developed countries. In fact, in the UK and France, property tax revenues account for over 4% of GDP (OECD, 2016). Babawale & Nubi (2011) reported that in Nigeria and other West African countries collection rate is as low as 10% of potentials.

Tax, everywhere, is generally abhorred and history is replete with spontaneous nationwide protests against new tax policy or mere tax rate adjustments in several countries, developed and developing, including countries like UK and a number of states in the US. Property tax, is particularly resented. Property tax is strongly criticized due to the inequities present in current systems; because it usually involves bulk payment; while assessment bias is identified in the tax base estimates. Furthermore, its visibility and direct impact; its tendency to be regressive; and the fact that it falls on unrealized capital gains and may be poorly related to cash flow, are other often cited drawbacks. The strongest drawbacks in property taxation system are perhaps those related with the tax base assessment.

Tax, however, must be paid to finance economic activities. Economic development thrives on the provision of basic government services and a higher rate of capital formation in production facilities. While there are many constraints to the delivery of these basic requirements in developing countries, the most universal and crucial is finance. Local resources including foreign grants, aids and loans, have proven insufficient and have continued to decline (Babawale, 2013). The developing countries, therefore, have to do what the developed countries have to do in their individual history, i.e. call on the citizens to make sacrifice. Taxation is central to the required sacrifice. Without a more rigorous and realistic tax policy, the economic development process of developing countries will be seriously impeded. In the developed countries, an average citizen has come to accept taxes as the price to pay for civilization. This is not so yet in the developing nations where it is generally regarded as an oppressive imposition or, at least, a necessary evil. Property tax is particularly more generally disliked by taxpayers because, among others, it confronts taxpayers directly with the cost of providing urban services. Policy makers likewise detest property tax especially because it attracts an unusually high political sensitivity within the tax structure. According to Kitchen (1992), due to their high visibility, property taxes are subject to extensive pressure because unfairness, inefficiency, and administrative problems are clearly perceptible. In fact, the most usual assessment bases adopted, i.e. the real estate market values, rental values, and site values, are not related directly to ability-to-pay. As a result, where local authorities have access to a less efficient but more politically tolerant revenue sources, these tend to be exploited first (Dillinger, 1991). Non-accountability and poor administration, failure to provide those essential services for which rates are collected, brazen corruption among local government officials in the areas of rate assessment and collection, and the tendency to employ property tax rates as a weapon against political opponents, are other major reasons why property tax is detested in certain quarters (Babawale & Nubi, 2011).

Equity in Property Taxation

Since people generally view taxation as a necessary evil, economists over time, beginning with Adam Smith, have laid down certain principles (cannon of taxation) that provides guides to policy makers when drafting tax laws in order to minimize the pains to tax payers and thereby improve compliance and revenue yields. The principles which include equity or fairness, certainty, convenience, economy, productivity, elasticity or flexibility, and diversity; remain the diagnostic criteria for assessing tax policy and administration; they remain the universal hallmark of sustainable and efficient property tax system, anywhere till date. The concept of equity, in particular, remains a fundamental doctrine in taxation. Otubu (2017) opines that the equity principle transcends the other principles as it encompasses them all one way or the other. From ancient civilizations, particularly in the Greek and Roman Empires up until colonial America, equity in land taxes has remained a contentious issue (Carlson, 2014), while

Norregard (2013) wondered why the consideration of equity or fairness remains a long-standing and contentious issue for a tax as ancient as the property tax.

The terms 'equity' and 'fairness' are often used synonymously in tax literature. Equity is a synonym for tax fairness (IAAO, 1997). However, from the perspective of property taxation, a distinction is necessary. According to Woolery (1989), "fairness" generally relates to the legislation upon which the tax is promulgated which often specifies whether different types of property are to be taxed at different rate or percentages of market value or whether different groups of 'taxpayer' are to be given some form of preferential treatment, such as reliefs, rebates or exemptions. The fair share principle in taxation is built on the two concepts of the benefit principles and the ability-to-pay principles. The benefit principle subscribes to the view that tax burdens are to be shared or distributed in the same proportions as the benefits derived from government; whilst the ability-to-pay principle anchored on the premise that highest taxes should be levied on those with the highest ability to pay.

'Equity' or 'assessment equity', on the other hand, is a measure the quality of property tax system administration in terms of assessed values. An equitable tax system is "a system of assessment and taxation characterized by uniformity, equality and just valuation based on property wealth". Lack of equity has been universally recognized as a principal clog in the wheel of efficient and effective property tax system with serious implications on compliance and revenue yields buoyancy. The ability-to-pay concept is based on two measurable constructs: horizontal equity and vertical equity. Both of these constructs have an important bearing on the actual distribution of the tax liability, ignoring any tax reliefs, etc. (IAAO, 1997).

Horizontal Equity

In public finance, horizontal equity is the idea that people with a similar ability to pay taxes should pay the same or similar amounts. It is related to the concept of tax neutrality on the idea that the tax system should not discriminate between similar things or people, or unduly distort behaviour. The principle of horizontal equity provides that two identical properties of the same value should have the same assessed value. That is, similar properties in a given jurisdiction should share equal tax burden. For example, if a property has an assessment value: sales price ratio of 0.80, it would be expected that comparable properties' assessment values: sales prices ratios to be near 0.80. The standard measure for horizontal equity (fairness across comparable properties) is the coefficient of dispersion (COD). The COD is calculated by finding the average of all absolute deviations from the median in percentage terms. In measuring the level of assessment, the IAAO recognizes the difficulty of perfect horizontal equity. The standard is a 15 % range around the jurisdiction median assessment ratio in areas where housing type is diverse. The standard acceptable COD is 10 percent for areas where the housing type is similar in age and design (IAAO, 1999). A COD of 15% means that properties have ratios that on the average deviate by 15% from the median ratio.

Vertical Equity

The principle of vertical equity states that two properties having the same value should be assessed equally or that a property that is twice the value of another should have twice the assessed value. For example, if the assessed value of a N100 million property is N90 million (0.90 ratio), then assessed value for a property having a market value of N200 million is expected to be N180 million or thereabout (0.90 ratio). Vertical inequities can either be regressive, where high-valued properties are under assessed relative to low-valued properties; or progressive, when the opposite holds true. Concerns about local tax systems have centred more on the vertical equity issue and on the possibility that local taxation might be regressive, that is, low-income residents pay a greater percentage of their income in local taxes. The price-related differential (PRD) is a common measure for vertical equity. PRD is an index that is centred on the number one or unity. It is calculated by taking the overall mean assessment-sales ratio of a jurisdiction and dividing it by the sum of assessment divided by the sum of sale price (weighted average).

According to IAAO standards for quality assessment, a PRD index between 0.98 and 1.03 is the acceptable standard (IAAO, 1999).

The Role of Valuation in Property Tax Assessment Process

The role that valuation plays in the overall property tax system is to assist the system in distributing the tax burden logically and objectively amongst taxable properties thereby contributing to the equity of the system. The larger proportion of the equity problem in property tax therefore arises from the assessment process and the quality of the resultant assessment. Assessment equity in property tax measures the degree to which assessment bears a consistent relationship to market value for all properties at the assessment date. There is perfect equity when the ratio between assessed value and market value is constant across properties in a given tax jurisdiction. Assessment bias occurs when some classes of property have a ratio of assessment to value significantly different from the ratio of others in the same taxing jurisdiction (IAAO, 1978). Where the assessment process is less than efficient, the quality of other aspects of the tax administration is invariably compromised. Inaccurate assessment jeopardizes the fairness of the tax system, diminishes its ability to raise adequate revenue, and creates economic distortion, among others. For example, if a parcel is under-assessed relative to comparable parcels, the owner of under-assessed property will pay *less* than his/her “fair share” in taxes. On the other hand, if a parcel is over-assessed relative to other properties, that owner will pay more than his/her “fair share”. It is the failure of the valuation process to attain horizontal and/or vertical equity that invariably brings the tax system into disrepute with far-reaching consequences. Inaccurate assessment aggravates both vertical and horizontal inequities, encourages corruption with all attendant consequences in terms of tax avoidance, evasion, delinquencies, appeals and resultant poor revenue yields. Lack of equity creates poor revenue yield due to non-compliance, reduced tax base, public resistance as taxpayers to lose confidence in the system, and avoidable payment delays. Since the assessment process and quality of assessment is the foundation of the property tax system, valuation becomes the root from which all other components of the property tax can be accurately evaluated. Accurate valuation of the tax base is therefore central to a successful property tax system.

Critical Tax Assessment Decisions affecting the Equity of Property Tax System

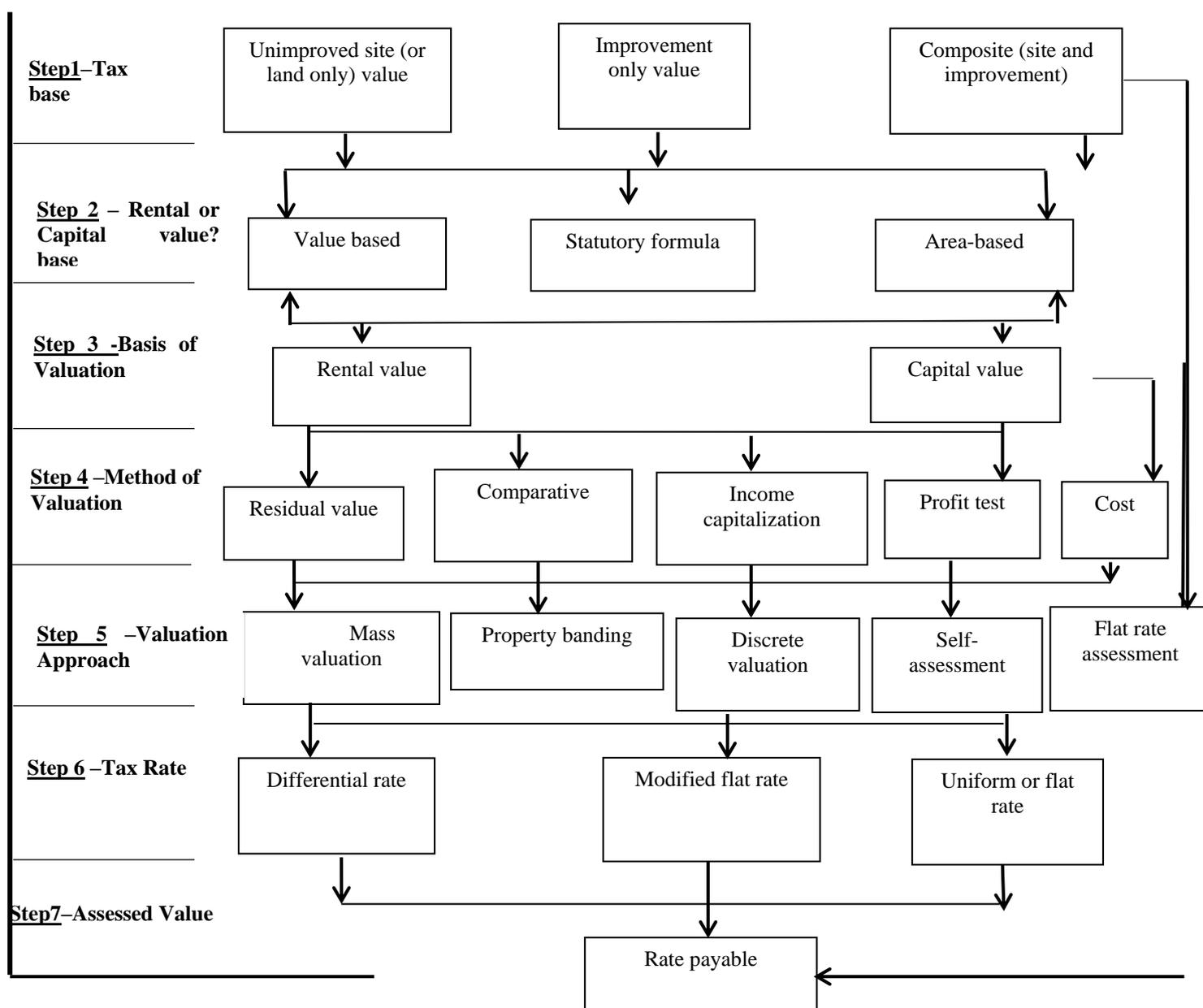


Figure 1: Alternative Property Tax Valuation Process/Models

Figure 1 outlines seven major steps in the process for assessing property tax. Each of the steps requires key decisions which ultimately determine the equity of the tax system. They are:

- i) whether the tax base or the object of taxation should be land only, improvements only or a combination of land and improvements.
- ii) whether the basis of valuation should be value-based, area-based and/or by a statutory formula;
- iii) whether the assessment should be based on capital value or rental value;
- iv) whether the method of valuation should be cost, or comparative, or income capitalization, or profits or accounts, or residual, or flat rate assessment;
- v) whether the approach to valuation should be discreet (property-by-property) valuation, or property banding, or mass valuation, or by self-assessment;
- vi) whether the tax rate should be uniform or flat rate, differential rate or a mix of flat and differential rates.

The seventh, which is not part of Figure 1 is whether the method of re-valuation (when it is due) should be complete property-by-property re-valuation, or mere rate adjustment, or by indexation.

It follows that the way and manner these components are specified and combined ultimately determines the efficiency of the tax system and its revenue yields potential. According to Byrne (1996), models should adequately represent the problem structure, simple and easy to understand, capable of unequivocal objective interpretation, flexible and involving minimum calculation while satisfying the economy of time, cost and resources.

The goal of this paper is to identify the aspects of the valuation process in the new Lagos State Land Use Charge (LUC) 2018 that pose the greatest threat to equity and consequently compliance and proffer alternative approach to circumvent the clog while enhancing the simplicity, transparency, cost effectiveness of the valuation process, as well as the potentials for improved compliance and tax revenue yields.

The Lagos State Land Use Charge Law, 2018

The Lagos State Land Use Charge (LUC) 2018, like its immediate predecessor, the Land Use Charge 2001 (LUC, 2001), represents a radical and wholesome restructuring of the entire erstwhile land-based tax system in the state. Prior to the 2001 reform intervention, land-based tax in Lagos State has evolved into a complex system of three different taxes, rates and charges administered by different agencies and at different levels of government. These included the Land Rates Law, the Neighbourhood Improvement Charge Law and Tenement Rates. When a new Land Use Charge was announced, there was a high expectation that the new law (LUC, 2018) was being contemplated apparently to build on gains of erstwhile reform (LUC, 2001) and probably to plug loopholes and redress certain policy and administrative inadequacies or contradictions. Commenting on LUC 2001, Babawale & Nubi (2011) noted that “the protest that greeted the passage of the LUC 2001 was loud, vehement and spontaneous, cutting across all stakeholders as well as all sections of the general public.

The Nigerian Institution of Estate Surveyors and Valuers (NIESV), the Nigerian Bar Association (NBA), the Chartered Institute of Taxation of Nigeria (CITN), among professional bodies and the organized private sector (OPS) have particularly attacked the law on various grounds describing it variously as outrageous, vexatious, objectionable, draconian, unrealistic, spurious, ill-conceived, uncivilized, retrogressive and a breach of democratic ideals, among others. The OPS, the major stakeholders and a number of its numerous affiliated bodies have dragged the state government to court challenging various aspects of the law. Major Nigerian newspapers have run series of editorial commentaries on the law advising the Lagos State Government to give the law human face and tread the path of negotiation and dialogue with the stakeholders.

The Lagos Millennium Group on the Environment, an NGO, called on its members to disregard the law.” The latest intervention (LUC, 2018) which is probably intended to smoothen the rough edges in the 2001 law seems to head the same way as the former in what turns out to be a more provocative and controversial provision.

Assessment Process Under LUC, 2018

The tax or charge is calculated as follow:

(Land Value + Building Development Value) X relief Rate X Charge Rate

Interpreted as:

$$\text{LUC} = M \times [(\text{LA} \times \text{LR}) + (\text{BA} \times \text{BR} \times \text{DR}) \times \text{RR} \times \text{CR}]$$

Where,

LUC	=	annual amount of Land Use Charge in Naira.
LA	=	the area of the land parcel in square metres.
LR	=	the average Market Value of a land parcel in the neighbourhood, on per square metres basis in Naira based on the market value of the property as determined by professional Valuers appointed by the commissioner for that purpose.
BA	=	the total developed floor area of building on the plot of land in square metres, or the total floor area of apartment unit in a building where the apartment has a separate ownership title.
BR	=	the average construction value of buildings and improvements in the neighbourhood or a per square metre basis in naira based on the market value of the property as determined by professional Valuers appointed by the commissioner for that purpose.
DR	=	the Depreciation Rate for the buildings and improvements of the land which account for the building being of higher or lower value than the average buildings in the neighbourhood and which also account for the degree of completion of construction of the building.
RR	=	the rate of relief from tax (if any) applicable to the Owner Occupier in the circumstances shall be determined by the commissioner and shall be published in the State Government Official Gazette and in one or more newspaper circulating within the state and reviewed by the Commissioner once every five years.
CR	=	the annual charge rate expressed as a percentage of the assessed Market value of the Property and which may, at the State Governor's discretion vary between (a) Owner-occupied and other Property; (b) residential Property and Commercial (revenue generating) Property; (c) Physically challenged persons; and (d) persons who have been resident at the same location for at least twelve years, minor, and retired Owner and Occupier, on the one hand, and other Owners and Occupiers on the other.

Table 1: Land Use Charge Annual Relief Rate

S/N	Item	Annual Relief Rate	Remarks
1	General Relief	40%	Applicable to all properties liable to pay Land Use Charge
2	Specific Reliefs (Applicable in Property Owners and Lease of 10 years and above).		
	I Pensioner	100%	Owner Occupied – 60 years & above
	II Persons and disability	10%	Owner occupied
	III Aged Persons	10%	Owner Occupied – 70 years & above
	IV Age of property	10%	25 years and above
	V Long occupation by Owners	5%	12 years and above
	VI Federal and other State Government Properties	20%	None Revenue Generating
	VI Partial Relief under the I land use charge law	20%	None profit making
2b	The onus is on a person seeking a Specific Relief to provide relevant documents in proof		
3	Payment within 15 days of receipt of Demand Notice	15%	timely payment discount
4	Mode of Application for relief	All applications for relief must be made to the Commissioner for Finance for approval supported with relevant documents.	
5	Minimum Land Use Charge	₦5,000.00	No Property liable to Charge shall pay a sum less than ₦5,000.00 (Five Thousand Naira irrespective of any relief granted).

The annual land use charge rates to be applied to eligible properties in Lagos State shall be as follows:

Table 2: Land Use Charge Annual Rate

A	Owner-Occupied Residential Property	0.076% per annum of the Assessed Property Value
B	Owner-Occupied Pensioner's Property	Exempted from Land Use Charge
C	Lagos State Government Properties	Exempted from Land Use Charge
D	Industrial Premises of Manufacturing Concerns	0.256% per annum of the Assessed Property Value.
E	Residential Property (Owner and 3 rd Party)	0.256% per annum of the Assessed Property Value.
F	Residential Property (without owner in residence)	0.76% of the Assessed Value;
G	Commercial Property (Used by occupier for Business Purposes)	0.76% of the Assessed Value;
H	Vacant Properties and Open empty Land	0.076% per annum of the Assessed Value.

That is, the LUC, 2018 provides for a modified area-based mass valuation using the cost approach. The contrived statutory formula produces an undefined value (howbeit, erroneously referred in Section 10 of the law as the 'market value of the property'). The choice of mass valuation over discreet valuation (property-by-property valuation) is also in line with modern property tax practice. In mass appraisal, the ordinary principles of real estate valuation apply. However, unlike in the conventional valuation procedure where individual property is inspected and measured, market information is collated on individual property basis, and the property is valued discretely; mass valuation is based on extrapolation of data collected from samples of comparable properties. The valuation approach is based on the

rationale that properties that exhibit similar value-determining characteristics in the same or similar location will have the same value. Among other benefits, mass valuation approach is cheaper, simpler and administratively more convenient as it relies on few market evidences for interpolation; reduces room for Valuer's discretion; computer-assisted mass valuation can be quite accurate, particularly when used in a homogeneous area, there is also evidence that they are not accurate in other instances such as when the appraised property does not conform well to the neighbourhood; mass appraisal can greatly reduce the time to complete a value estimate.

The choice of area-based assessment over value-based assessment is also a welcome reform measure in a sense. Area-based assessment also has considerable benefits over value-based assessment for certain categories of properties where the market evidences are not available in the right quality or quantity or both. Among others, it is cheap and simple to introduce and manage and attracts little argument because of the factual nature of the tax base, thereby obviating the need for high level technically-and professionally-skilled valuation staff and eliminating the need for costly collection and analysis of market data; has the ability to operate effectively in the absence of an active, healthy and comprehensive property market as is the case in many developing countries including Nigeria. The merits of the strict area-based technique have been grossly compromised and tainted by the so many arbitrary and baseless modifications introduced into the contrived formula leaving it without form or standard.

However, the crux of the controversies that greeted and continue to trail the Land Use charge 2018 and similarly its immediate predecessor, the Land Use Charge 2001, centres principally on the choice of 'capital value' assessment over the rental value assessment; while the latter is generally considered to be more appropriate, pragmatic, objective, transparent, logical and equitable. It is commonly believed that if this singular controversy is appropriately addressed and redressed, all other misgivings about the law will fade into thin air.

Capital Value or Rental Value?

The choice between rental or capital value assessments vary from country to country and the choice has largely been dictated by administrative feasibility and, in particular; the type, quantity and quality of available transaction data. According to McCluskey & Bell (2008), the choice between 'capital' or 'rental' value is hinged upon market data and taxpayer perception. The argument is that there must be a strong correlation between the form of market data evidence and property tax system. Thus, in countries where majority of property is held in leasehold (a dominant rental market) the focus should be on rental value; however, where the property market is dominated by high levels of owner occupation, freeholds and sales, the focus should be on capital or sale value. The latter is particularly true of countries where the mortgage system (home ownership rather than home renter) is reasonably developed and the property market relatively active so that transaction evidences for sold property is amply available in the open market more than rental evidences (particularly, for housing which represents the bulk of property stock in any city or village). In such countries, the capital value is further de-capitalized to arrive at the annual rental for purpose of arriving at the rateable value because the ultimate basis of assessment is invariably the annual value, net or gross. Whereas, in countries like Nigeria, where the mortgage system is epileptic and poorly developed so that the property market is dominated by renters more than owner-occupiers, the direct rental basis is more apt and preferred.

In theory, there ought to be no differences whether the capital or the rental value is used. Provided a property is put to its highest and best use and is expected to continue to do so, rental value will bear a predictable relationship to market value as the discounted net stream of rental payment will be approximately equal to market value. However, this relationship does not always hold for two main reasons, among others. First, gross rents are often used rather than the economically relevant "net" rents that build in an allowance for maintenance expenditures, insurance costs, and other expenses. Second, most countries tend to assess rental value on the basis of current use rather than the best and highest use.

Whatever may be economic consequences between using rental and capital value basis, what is essential is a tax valuation system that is objective and transparent; that is politically creditable and administratively feasible thereby eliminating or at least minimizing opportunities for dispute or collusion; and a methodology that is appropriate to local skills and the market information that is readily available within the tax jurisdiction. Ideally, the tax burden should be distributed amongst all tax payers de jure and de facto, according to the ability of individual to pay (Sulija & Sulija, 2005). The feasibility and viability of any taxation system generally depends on the perceptions and the level of acceptance of the process and its underlying basis by taxpayers. Successful application of any property tax system in a cost-effective way requires a pragmatic tax administration procedure and a friendly tax administration environment.

What's ideal for Lagos State?

For Lagos State, the rental value option is more appropriate and equitable, and obviously provides more transparent and objective basis of assessment compared to the area-based/cost/statutory formula basis prescribed by the law for a number of cogent reasons including:

- i) Property tax is a tax levied against the deemed value or against the income arising from property, rather than against an individual or a legal entity;
- ii) Since property tax is an annual charge then the tax ought to be paid from income flow rather than wealth (a stock); it is more appropriate to tax the net rental value obtainable than the capital value. Moreover, it is easier for an average tax payer to relate readily more with a property tax assessed in proportion to the annual rent accruing from the taxed property than the capital value or any other value definition. For the taxing authority, tax assessed on the basis of annual income rather than capital value, makes it easier to appreciate when the assessment is getting beyond a reasonable proportion of the earning capacity (annual) of the taxed property;
- iii) It is a universal principle that tax burden should be distributed amongst all tax payers de jure and de facto, according to payers' abilities to pay rather than "highest and best use" of the property. The application of rental value provides a more direct and incontrovertible relationship between the tax and 'ability to pay', while eliminating the need to introduce arbitrary deductions, depreciation allowances and ratios which render the assessment process under the new law rather artificial and highly subjective thereby making it susceptible to human errors and deliberate manipulations.
- iv) All over Lagos State, the market for annual rent (rather than sale value) is relatively active, and indeed active enough to provide adequate evidences required for an *ad valorem* tax, at minimum cost. The annual rent passing on different classes of property (particularly residential property which represents the bulk of property stock) in most parts of the state is a common knowledge or can easily be imputed by over 400 firms of Estate Surveyors and Valuers dotted across the length and breadth of the state; whereas the capital value market is thin and opaque.
- v) The calculation of 'capital value' using the contrived formula introduces a number of subjective and contentious variables/parameters into the assessment model; making it highly artificial and highly manipulative; thereby resulting in ultimate assessments that are spurious, inconsistent, and therefore controversial. The value produced by the formula remains undefined; and has no foundation or meaning both in theory or practice. It therefore remains logically indefensible!
- vi) Assessment on the basis of annual rent involves virtually no 'valuation' thereby eliminating all controversies surrounding the choice of valuation method, rate of depreciation, and other arbitrary deductions or allowances. All that is required is an average annual rent passing on each category of rateable properties in each neighbourhood thereby administrative minimizing costs considerably.
- vii) Rates assessment via capital value overlooks the fact that annual return on property is one of the lowest in the investment markets ranging from as low as 4.5% for prime residential properties to 8% for purpose-built industrial properties. It is indeed the growth potentials that makes property to be preferred above some alternative investments. Unless the policy takes cognizance of this truth which is more apparent where the rental basis is used, instances where properties are taxed

beyond their potential annual incomes, as was alleged under the LUC (2001) and is already resurfacing under LUC (2018), is inevitable.

- viii) The rental value assessment obviously satisfies the canons of taxation i.e. equity (or fairness), certainty, productivity, flexibility, diversity, productivity, economy and simplicity more than the capital value assessment and particularly the Area-based cum Statutory Formula as provided by LUA (2018).
- ix) Ability to pay depends on the value of the property. However, the assessment under LUC (2018) using the contrived formula produces neither the rental nor capital value; the ‘value’ produced is in fact undefined and therefore lacks consistency, rationality, and of course, equity.
- x) On the whole, the annual rent basis improves the transparency and simplicity of the tax system; it is more cost-effective and promises higher potential for compliance and revenue yields buoyancy.

How the Rental Value Basis Works?

For property tax purposes, the rental value can be assessed on gross annual value or net annual value basis, usually the former. When the gross annual value is calculated, allowances are made for necessary outgoings to arrive at the net value as the rateable value. The enabling statute may provide specific lump sum or a percentage allowance for outgoings (landlord’s cost of repairs and insurance and other expenses, if any, necessary to keep the hereditament in a state to continue to earn its annual income) as statutory deductions. For example, a uniform 20% may be allowed to cover these costs across board making 80% of the annual rent receivable the rateable value. To the Net Annual Value (NAV) or rateable value figure is then applied the rate nairage (that may vary between categories of properties) as determined by taxing authority to arrive at the rate payable.

Illustration 1

(1) A 4-bed room wing of duplex in Gbagada which currently let for N2,500,000 will be assessed as follows:

Annual rent	N2,500,000
Less allowance for landlord’s outgoings @ 20%	500,000
Net Annual Value (NAV)	2,000,000
Applicable rate @ 5%	x 0.05
Therefore, rate payable	N100,000

Illustration 2

A block of 8 Nos. 3-bedroom flats in Ikoyi which currently let for N5,000,000 per flat i.e. a total of N40 million for the whole block will be assessed as follows:

Annual rent	N40,000,000
Less allowance for landlord’s outgoings @ 20%	8,000,000
Net Annual Value (NAV)	32,000,000
Applicable rate @ *5%	x 0.05
Therefore, rate payable	N1,600,000

*Rates ranging from 3.5% to 5% of NAV would be ideal and should generally be acceptable. Taxpayers should be willing to pay this range as tax given that a higher proportion of property values are created by government expenditure on infrastructure and services.

For Specialized Properties

For highly specialized properties that are rarely traded in the market for lease or sale, a strict area-based (no artificial formula) can be adopted. Under a strict area-based assessment system, a charge is levied per square meter of the land area or per square meter of building area, or some combination of the two. Assessment therefore results in a tax liability that is directly related to the size of the land and building (s). The assessment rate may be the same for land and building, or it may be different; for instance, a lower unit value per square meter might be applied to building to encourage development, for instance.

Illustration 3

(1) An eatery built on a land area of 1000 square metres and providing a gross floor area of 250 square metres may be assessed as follows (assuming assessment rate for this category is 1% for land and 0.4% for improvement)

Land area: 1000 m ² @ N10,000	N10,000,000	
Building area: 250 m ² @ N75,000	N18,750,000	
Rate payable calculations:		
Land: N10,000,000 @ 1%	N100,000	
Improvement: N18,750,000 @ 0.4%	75,000	
Total property tax payable		N 175,000

OR

De-capitalized to obtain the rental value:		
Capital value of the property (land & improvement)	N28,750,000	
Average yield on Eateries say, 6%	0.07	
		2, 012, 500
Less allowance for landlord's outgoings @ 20%	402,500	
Net Annual Value (NAV)	1,609,500	
Applicable rate @ 5%	x 0.05	
Therefore, rate payable		N80,475
		Say, N80,500

Illustration 4

(1) The industrial premises of Alberny Nig. Ltd., a manufacturer of a brand of Instant Noodles, covers a total area of approximately 10,000 m². Out of this, the main factory occupies 1,500 m², the 2 Nos. office blocks on single floor occupies gross area of 380 m² and 450 m², respectively; the staff canteen occupies a gross floor area of 110 m²; while the Security/Gate house/Store covers 48 m². Construction rates are as follows: N180,000/ m² for the factory; N150,000/ m² for the offices; N75,000/ m² for the canteen; and N60,000/ m² for the gatehouse/store. Again, assessment rate for this category of property is 1% for land and 0.5% for building.

A - Land	
Total land area: 10,000 m ² @ N10,000	100,000,000
B - Improvements	
Main Factory: 1,500 m ² @ N150,000	225,000,000
Office blocks: 450 m ² + 380 m ² = 830 m ² @ N150,000	124,500,000
Canteen: 110 m ² @ N75,000	8,250,000
Security/Gate house/Store: 48 m ² @ N60,000	2,880,000
Total for improvement	N360,630,000
Rate payable calculations:	
Land: N100,000,000 @ 1%	N1,000,000
Improvement: N360,630,000 @ 0.5%	N1,803,150
Total property tax payable	N2,803,150

OR

De-capitalized to obtain the rental value:	
Capital value of the property (land & improvement)	N360,630,000
Average yield on Eateries say, 6%	0.08
	28, 850, 400
Less allowance for landlord's outgoings @ 20%	5,770, 080
Net Annual Value (NAV)	23,080,320
Applicable rate @ 5%	x 0.05
Therefore, rate payable	N1,154,016
	Say, N1,150,000

CONCLUSION

Equity theory of motivation in management states that individuals are motivated by fairness, and if they identify inequities in the input or output ratios of themselves and their referent group, they will seek to adjust their input to reach their perceived equity. Thus, the higher the individual perception of fairness, the greater the motivation level and vice versa. This theory which has its focus on employees' motivation in the workplace is, in many regards, equally relevant to property tax administration and particularly to improving tax compliance by improving taxpayers' equity perception of the tax system. A critical element in the successful implementation of property tax reform is support from tax payers. Such support is more likely if taxpayers both feel that they are receiving adequate services for the property taxes that they pay and if they perceive that the process is fair and accountable (Bird and Slack, 2002). Nothing undermines citizens' confidence than an inequitable tax policy. An arbitrary and discriminatory tax policy, administered haphazardly and prejudicially will only breed opposition and non-compliance; it will also lead to loss of faith and confidence in the elected representatives, retard the development of civic responsibility and endanger the democratic process. Contemporary policy makers are well reminded that tax payers perception of insufficient exchange equity and lack of representation in tax decisions were part of the triggers for the American Revolution and similar revolts in history across the globe. Taxpayers must have a positive perception of exchange equity.

Empirical and anecdotal evidences over the years and over the world confirmed that mere tax reform does not guarantee as sustainable system or improve revenue yields unless the tax system is realistically, equitably and judiciously designed and administered. They must be satisfied that in the long run, they are getting their commensurate services for the taxes they pay. In the words of Bird & Oldman (1990):

“The best approach to reforming tax in a developing country – indeed in any country – is one that takes into account taxation theory, empirical evidence, and political and administrative realities and blends them with a good dose of local knowledge and a sound appraisal of the current macroeconomic and international situation to produce a feasible set of proposals sufficiently attractive to be implemented and sufficiently robust to withstand changing times, within reason, and still produce beneficial results.”

RECOMMENDATION

The biggest administrative problem with property taxation is the assessment. First, this requires technical skill which, in most developing countries including Nigeria, is often in short supply, thereby necessitating the need to engage consultant valuers with its high cost of execution implications. Second, the process often involves a high degree of personal judgment and of contact between assessors and taxpayers which offers wide temptation to collusion particularly, undervaluation. Other delimitating factors include the prevailing attitudes towards anything called tax and poor level of logistic and technology including human factors. Valuation is an inexact science. In particular, property tax valuation process need not aim at achieving very high valuation accuracy, provided the procedure adopted guarantees objective, equitable, transparent and consistent results. According to Ratcliff (1972), fairness, not accuracy, is important in the levying of property taxes. To minimize distortion and inequity, it would also be necessary to standardize techniques and procedure into rational, equitable, and comprehensive system to minimize the subjectivity of the system and possibility of manipulation including revenue leakages. As such, countries, particularly developing and emerging countries where property market is still largely immature and transaction data in short supply, are encouraged to imbibe simplified valuation systems which limit site visits to physical measurement combined with application of standard formulas, perhaps with the aid of computer, may be more effective. In addition, being an annual tax, property tax should ideally be an *ad valorem* tax to improve the equity of the tax system. It is easier for both the taxing authority as well as the tax-payers to relate to the assessment based on the annual income receivable on a property than on its capital value. Assessment based on capital value may

cause the taxing authority to, wittingly or unwittingly, levy taxes in excess of the annual returns on property investment, thereby negating capital formation necessary for economic development and unwittingly pushing away the much-needed funds from the property sector particularly, the housing sector, to other sectors.

Finally, no one enjoys paying taxes or charges, but there are differences in the degree of acceptance or resentment which affect the intent to which people actively seek to avoid their obligations. Compliance can be encouraged in several ways including simplicity, transparency and the fairness of the assessment process, among others.

Given this peculiar property taxation environment; simplicity, fairness, transparency, explain ability and cost-effectiveness become the watchwords in designing appropriate valuation models for developing economies (Kelly & Musunu, 2000). These are universal hallmark of effective, efficient and sustainable property tax system. To maximize fairness and understandability in the property tax system, assessments should be based on current market value of property, and, for a place like Lagos State where the rental market is more active and open than the market for property sales, the annual rental value basis would be more pragmatic besides being far more equitable. The assessment process proffered by this study (see illustrations 1 – 4), which is anchored on annual property values, is no doubt, more transparent, simple, logical, objective, rational, consistent, cost-effective and particularly equitable. In particular, the assessment process eliminates the arbitrariness associated with the assessment formula prescribed by the law under review such as the allowance for accrued depreciation, general and specific reliefs, and the annual charge rates. Given effective coverage, efficient collection strategies, commensurate service delivery and a minimum revenue leakage; the rate payable, as assessed for typical examples illustrated above, should be fair to taxpayers and should suffice as an annual charge for a mega city that is in dire need of active private sector partnership in housing (including other categories of property development) to meet the alarming and ever-increasing gap between supply and demand.

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A Valuation Framework for Assessing Compensation Arising from Oil Spills in The Niger Delta Area of Nigeria

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ABSTRACT

Both empirical and anecdotal evidences suggest that valuers in the study area do not generally follow appropriate valuation procedure particularly when assessing compensation for environmental pollution arising from oil spills. This abuse of the valuation process, according to a number of extant studies, is largely responsible for widespread incoherent, inconsistent and controversial compensation assessment with its numerous potential socio-economic repercussions for a nation that oil revenue is her economic mainstay. This study is based exclusively on secondary data drawn from results of extant studies, valuation reports, relevant statutes and civil laws including several years of experience of one of the authors as expert witnesses in cases relating to compensation for oil spills in the study area. The paper is particularly written in response to Babawale (2013) which observed certain fundamental procedural deficiencies in valuation for compensation with “potentially grave repercussion for the integrity and the future of the valuation profession in the study area.” To redress the observed deficiencies and save the profession from further embarrassment, the study provides practitioners with an institutional perspective; a purpose-designed procedural framework that reflects and addresses the peculiarities of valuation for compensation for oil spills. Besides contributing to the recurrent debate on the vexed subject of compensation for oil spills and filling up part of the apparent wide gap presently existing in the body of knowledge particularly in Nigeria, the eight-step valuation process proffered is expected to boost valuers’ confidence and improve the reliability of valuation for compensation in the study area. The ultimate goal is overall improvement in the practice of valuation for compensation in the study area in particular, and Nigeria as a whole. This is expected to minimize the costs of protracted court cases including the contention and restiveness that is often associated with compensation matters in the study area.

Keywords: compensation, oil spills, Nigeria, valuation process.

INTRODUCTION

Nigeria is today the largest oil producer in Africa and the sixth largest in the world, and, according to the Oil and Gas Journal, the country as at January 2011 maintained an estimated 37.2 billion barrels of proven oil reserves (Achebe, Nneke & Asiniji, 2012). In addition to oil, Nigeria holds the largest gas reserves in Africa. Nigeria’s economy is largely dependent on the oil sector which contributes between 90% and 95% of her export earnings, 20% of GDP and about 40% of government revenues (Nwilo & Badejo, 2005). Nigeria’s oil and gas reserves exist largely along the coastal Niger River Delta area and offshore to the Bright of Bonny.

Nigeria’s fortune from the oil industry has not come without its costs particularly in massive environmental contamination. Since the discovery of oil in Nigeria in the 1950s, the oil-producing Niger Delta area has continuously suffered various environmental degradations as a result of oil spills resulting

from various oil prospecting, drilling, and transportation activities and particularly through one or a combination of corrosion of pipe and storage facilities, operation failure, mechanical failure, natural hazards, and third-party activities in forms of malicious incidents and acts of sabotage (Achebe *et al.*, 2012; Egbe & Thompson, 2010; Roddewig, 1999). Oil contamination creates problems that disrupt the lives of people living in close proximity to oil wells, pumping stations, camps and pipelines including contamination of drinking water, top soil, and various diseases affecting livestock, humans and aquatic lives.

By virtue of Decree No. 24 of 1975 (now Cap E13, Laws of Federation of Nigeria, 2004), the Estate Surveyors and Valuers (referred to as 'Valuers' or 'Appraisers' in other climes) are the sole professionals statutorily recognized in Nigeria to provide advice on the value of pecuniary interests in land or landed property for various purposes including compensation arising from oil spills. In compensation cases, the Estate Surveyor and Valuer is often required to prepare valuation upon which the claimant and/or the defendant seeks redress and/or prepares his/her/their defence, as the case may be. He may also be required to prepare a brief or proof of evidence for the claimant or the defendant solicitor; and may also appear as expert witness before a regular court or tribunal or any other jury. His role is to help the court or jury arrive at a just and fair decision on the quantum of compensation that is reasonable and adequate in the circumstance. Estate Surveyors and Valuers therefore play a pivotal role in adjudication involving compensation for oil spillage which claim often runs into billions of naira (N) (1US\$=N361). Where this function is performed creditably, objectively and transparently, the judicial process and costs to parties in dispute are minimized and the resultant judgment generates little or no controversies. On the other hand, where the Valuer performs below Generally Acceptable Standards, the controversies that ensue often prolong the judicial process, increase costs of litigation and contribute to relentlessness in the study area. It is on record that several cases of compensation for oil spills in the study area have lingered in the courts for several years, in some cases more than ten years, with attendant frustration and civil disturbance. A typical example was the *Ejamah-Ebube Community v. Royal Dutch/Shell* case, which was in court for over 33 years. While the contention generated by the valuation may not be the sole reason for such delays, experience and anecdotal evidences have shown that it is often the cause of majority of the cases because the valuer's assessment invariably forms the basis (or provides the actual sum) for the claim ultimately awarded by the court.

Extant empirical studies have identified, among other reasons, inappropriate valuation process as a major cause for unreliable and contentious compensation assessments as certain legitimate considerations and issues of consequences were wittingly or unwittingly omitted or compromised in the valuation process (Onugu, Iwu, Schopp, Czebiniak & Otegbulu, 2013; Kakulu, 2008; Babawale, 2013; Kakulu, Okorji, Mumeya, Izebe & Wokoma, 2014). In particular, in a content analysis of 30 valuation reports on compensation for oil spillage prepared by Valuers operating in the study area, Babawale (2013) observed a number of misgivings, inconsistencies and abuse of the valuation process which this study primarily seeks to address. Among others, it was found that only a negligible proportion of the valuation reports made reference or reflect relevant provisions of the enabling statute or other legislations or civil laws; and in 57% of the cases, the valuation figures were unsupported with any data and it was not shown how the figures were computed. In a number of the reports, valuers attempted to use, or purportedly used, one or more of the three conventional methods namely: The Comparative, Cost, and Income Capitalization methods; howbeit, in a manner that lack transparency, objectivity, rationality, and consistency. For instance, while using the Cost method, Valuers failed to specify the exact physical state of the object of valuation such as the age, size, type, capacity, and construction materials (e.g. fish fences, fish traps, fish ponds, and hooks) that were valued. Thus, there were arbitrary adjustments and, in some cases, no adjustment at all, for accrued depreciation. Similarly, in calculating compensation for 'disturbance' and 'injurious affection', Valuers employed the income capitalization approach but failed to justify or substantiate the choice of the number of 'years of recovery'; the rationale behind the partitioning of the estimated period for recovery into tranches for purpose of the required calculations, the estimates of gross incomes from fishing, the proportion of the total loss that is recoverable per period, the estimates for outgoings, and the choice of both the remunerative and accumulative rates. None of the reports covered 'non-used value' and none employed any of the non-market valuation methods such as the contingent method which are particularly relevant to this category

of valuation. More disturbing is the finding that only 27% of the reports included or reflected the inputs of any technical specialists which, rendered such estimates suspect.

The goal of this paper is to address these fundamental procedural shortcomings by proffering an alternative valuation process that particularly has assessment of compensation for oil spills in view and that sufficiently demonstrates transparency, consistency, objectivity, and traceability which, are the universal hallmark of reliable valuations.

VALUATION PROCESS FOR ASSESSING COMPENSATION FOR ENVIRONMENTAL POLLUTION

Real estate valuation is the art of developing an opinion of a defined value for real property. Valuation is a process; a step-by-step activity, beginning with valuation instruction up to and including the submission of the final valuation report. Both the Valuer training and valuation regulatory bodies generally prescribe a step-by-step process that Valuers are expected to follow through from valuation instruction to valuation reporting. Valuation process identifies the valuation problem, itemize the work necessary to get it solved; identifies the relevant information and data to be collected including their sources; verify, analyse and apply the data to estimate value (Appraisal Institute, 2013). While the process of determining all types of values (market value, mortgage value, insurable value, compensation value etc.) share a number of these steps or activities in common, the exact number of steps as well as the details of activities at each step vary with different value definitions.

The ultimate goal of most valuation assignments is to provide an opinion of market value. The valuation process depicted in Fig.1 represents the outline of the valuation process as it has become generally accepted in valuation literature and taught in various academic institutions over the years. Essentially, a typical comprehensive or narrative valuation report follows this order. The seven-steps model which is also prescribed by the International Valuation Standards Council involves definition of problem, scope of work, data collection and property description, data analysis, land value opinion, application of the approaches to the value, reconciliation of the value indication and final opinion, and report of the defined value (IVSC, 2013). The model is recognized by most valuation users and facilitates their understanding of valuation process and conclusions. The process is essentially normative as it suggests that valuers will proceed step-by-step from valuation instruction up to arriving at the final valuation and thereafter, the valuation report.

Though the model is tailored primarily towards arriving at the 'market value', it also presents a generalized pattern that "can be adopted to perform market research and data analysis, to apply valuation techniques, and to integrate the results of these activities into opinion of any defined value" (Appraisal Institute, 2013). That is, the model provides a generalized framework capable of necessary modification and which, indeed is expected to be modified when a valuer is considering a valuation opinion based on any of the other value definitions such as compensation, insurance, property taxation etc. According to May (1953), "given the manifold nature of valuation problems which such a framework must embrace and because of the differences in the valuation procedures, this framework must of necessity have to permit maximum flexibility in procedure and results." What the valuer requires in any valuation assignment other than 'market value' is certain modifications to this basic model to reflect and accommodate the peculiarities and requirements of the value sought.

Similar empirical studies have observed the tendency for Valuers in the study area to stick religiously and unreservedly to the valuation process depicted in Fig. 1 even when they are seeking to arrive at other value definition besides market value thereby failing, wittingly or unwittingly, to address or reflect the peculiarities of such value definition and which invariably leads to avoidable omission and/or compromise of vital information and essential steps in the valuation process. The result is a valuation process that lacks transparency, objectivity and consistency and therefore controversial. According to Ifediora (2009), Nigerian valuation practice has not emphasized sufficiently, as a developing practice should, on the issues of methodology and framework for valuation procedure. This

paper provides a modified version of the ‘generalized’ model depicted in Fig. 1 with particular focus on valuation for compensation for environmental contamination (oil spills) by making due and appropriate allowances for all issues, incidental specialized investigations, inventories, scientific tests and other specialists’ inputs, among others, as prescribed by the valuation regulatory bodies for this this highly-specialized valuation assignment (see Figure 2). The suggested eight-step process reflects the multi-faceted, multi-dimensional and multi-disciplinary nature of valuation for compensation arising from environmental impairment.

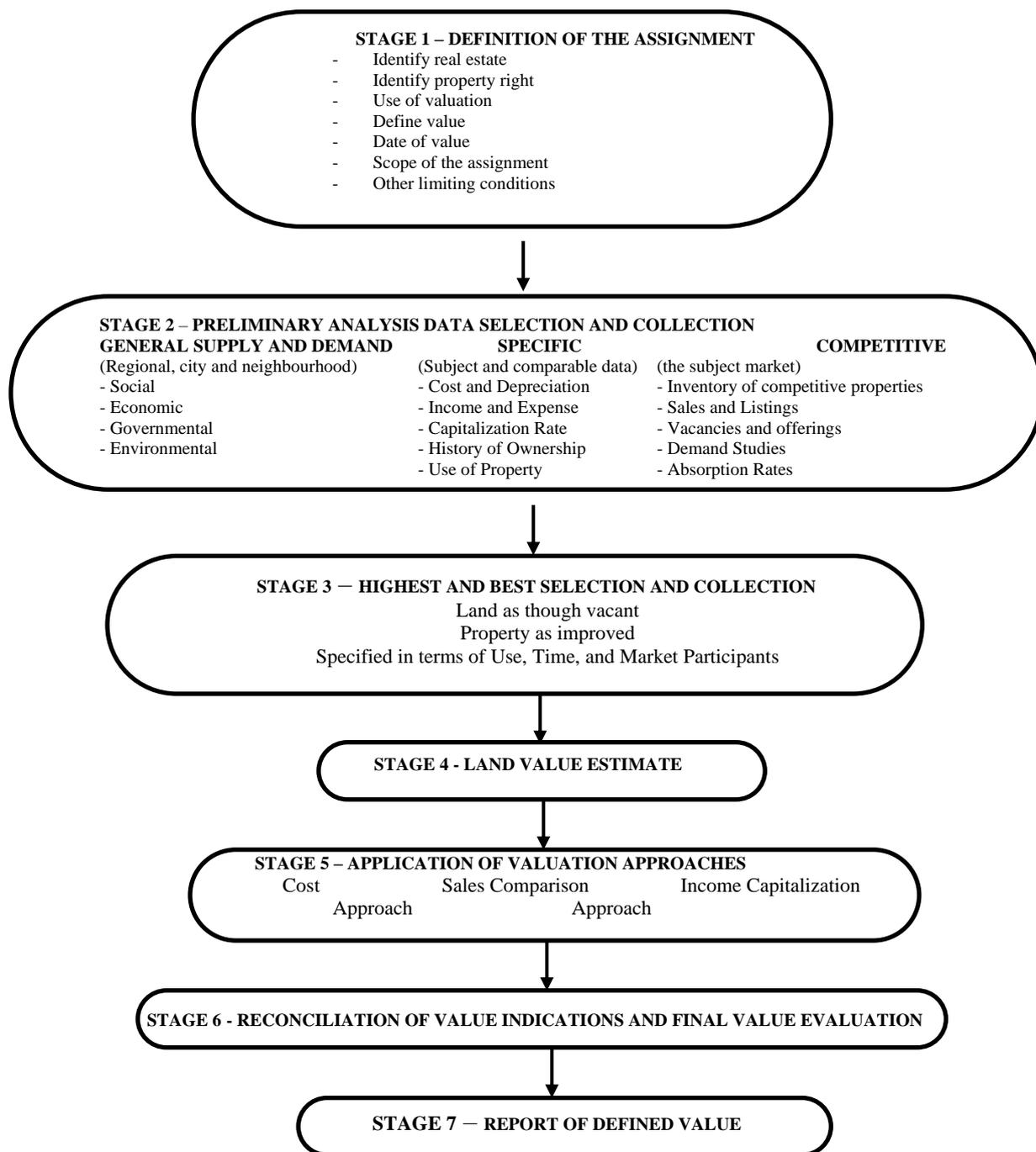


Figure 1: The Diagrammatic Representation of the ‘Generalized’ Valuation Process
Source: Adopted from IVSC (2003:206)

Issues and activities often covered in each of the eight-step process include:

1st step – Client’s brief: Identifying the Client and User, Object of Valuation, Purpose of Valuation, Type of Value Sought etc.

The first step in any valuation process is the development of a clear understanding of the problem the valuation seeks to solve or for which the valuation is required as the answer. A proper identification of the problem sets the parameters for the valuation assignment. For instance, the valuer must, from the onset, obtain a clear and unambiguous instruction regarding the identity of the real estate in question; the of interests involved; purpose of the valuation; definition of the value sought; effective date of the valuation; scope of the assignment and other limiting conditions. Others preliminary information include identification of claimants and/or end users of report which may be individuals, families, cooperatives, or communities or any combination of these. During this initial interaction with the client and the impacted area, the Valuer is able to provide answers to these enquiries and also come up with the appropriate definition of value and set out relevant limiting conditions and contingent assumptions.

2nd Step – Ascertaining the nature, extent and degree of impact and resultant liabilities.

The second step is to ascertain the nature, extent and the degree of the impact of the oil spills including the nature and incidence of the ensuing liabilities including the authentic claimants. With the aid of survey map prepared by professional land surveyor, the valuer obtains the required information by carrying out reconnaissance survey of the impacted area to obtain first-hand information on the nature and characteristics of the impacted area including the type of property affected, the type and nature of the contaminants, the degree and scope and severity of initial contamination etc. Considering all these in the light of what the relevant statutes and other legislations provide, the Valuer comes up with the categories of liability or ‘heads of claim’, and their respective claimants, among others. The laws and regulations applicable to a given valuation assignment, often create additional requirements in terms of data, investigations, methodology, object of valuation and the mode of report presentation. It is the responsibility of the valuer, in the light of all these, to determine the appropriate scope of work for the valuation assignment. The scope of work for a given valuation assignment will be acceptable if it leads to credible results, and consistent with expectations of parties who are regularly intended users for similar assignments and is consistent with what the actions of the valuer’s peers would be in the same or a similar assignment (Appraisal Institute, 2008).

The degree or severity of contamination, and consequently, the required compensation will vary from one location to another depending on the type of contaminant, the characteristics of the impacted area (nature of human settlements and activities, nature and variety of vegetation and crops etc.) the time or season that the spill occur, what the relevant statutes and/or civil laws prescribes which may include what qualifies for claim or the ‘heads of claim’, liability, beneficiaries and the basis and method of valuation, among others.

A Valuation Framework for Assessing Compensation Arising from Oil Spills in The Niger Delta Area of Nigeria

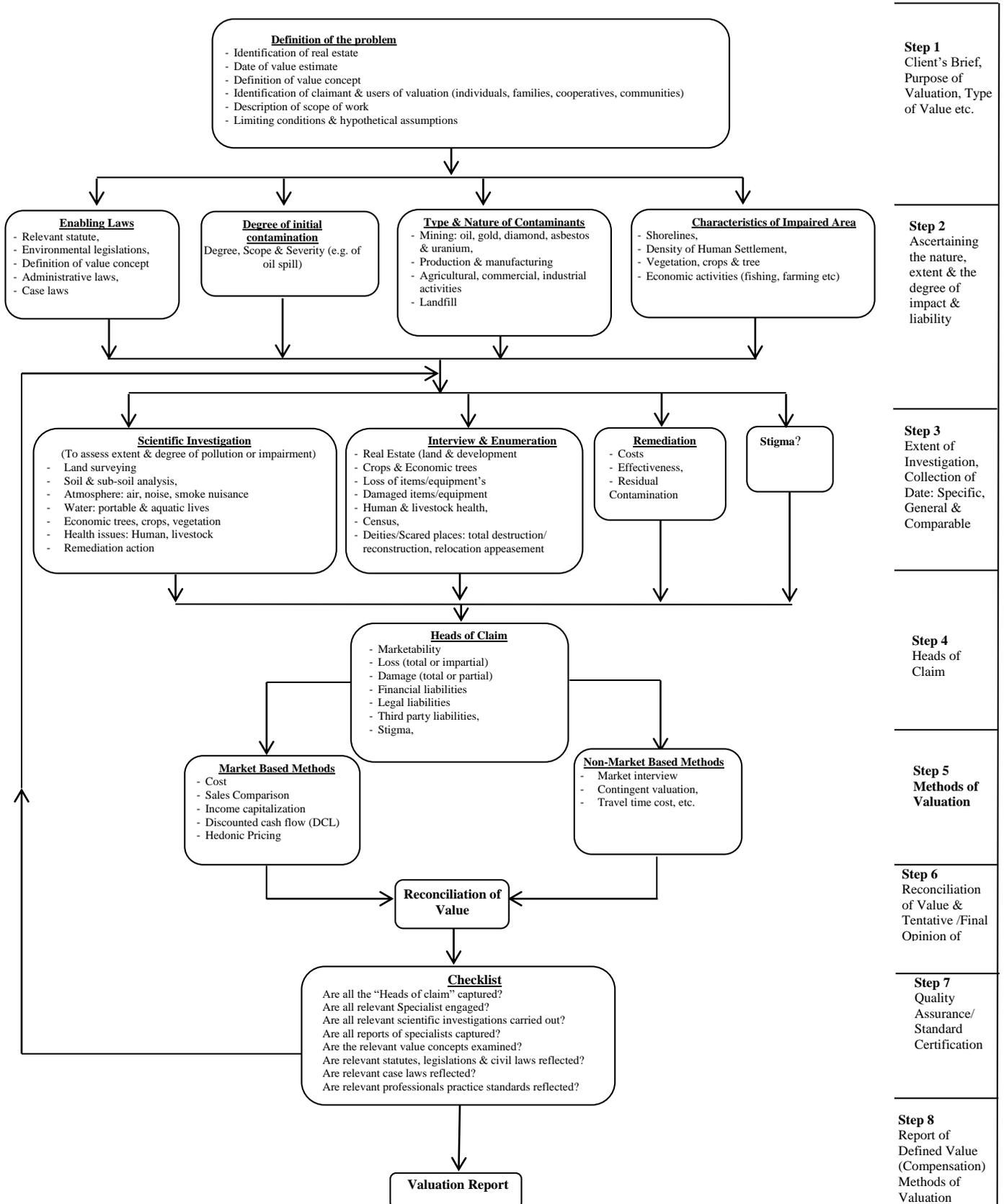


Figure 2: A Procedural Framework for Assessing Compensation for Environmental Impairment (e.g. Oil Spill)

3rd Step –Determining the extent of the required scientific investigations, inventories and enumerations - collection of required data.

Step three covers actual collection of relevant data. Valuation is data driven. And the quality and reliability of any valuation opinion depends primarily of the quality of the underlying data. Valuation for compensation for oil spills requires data that goes beyond the general, regional and site data usually required for some other valuations. The ultimate goal of the valuation process is a well-supported value estimate that reflects all the pertinent factors and considerations influencing the required values of the property given the intended use and users. A thorough analysis of the relevant market and industry would help the valuer to understand the interrelationships among the relevant statutes, regulations, valuation principles, market and industry forces and factors, and local circumstances that are germane to arriving at an adequate compensation that will not generate much controversies.

Given its sensitivity, valuation for compensation involves careful and extensive interviews various stakeholders especially occupants of impacted area and enumeration of such items as crops and economic trees, lost or damaged farming and fishing equipment, livestock, buildings or sacred structures or places which may require reconstruction or relocation with or without appeasement, as the case may be. More often than not, a number of scientific investigations are required covering soil and vegetation, air and water; aquatic lives, humans and livestock health. There may also be the need to ascertain remediation measures and their costs, the determination of residual contamination; and stigma effect. The stigma effect arises because potential purchasers or tenants may not believe that the property is completely free from contamination even after the clean-up; a market bias that invariably lower the property's value.

The present practice whereby real estate Valuers purport to provide estimates or assessment for these items instead of consulting relevant experts is questionable. The required scientific investigations are evidently outside the purview of a real estate Valuer's training and expertise. Many compensations claim in the study area, according to Babawale (2013), ran into a ditch during court proceedings because Valuers erroneously take on these functions thereby rendering their evidences (reports) inadmissible before the courts for lack of competence. The assessment and costing of the impact of oil spills on the eco-system, vegetation, microbes, aquatic lives, and human health requires the involvement of relevant specialists. The relevant technical specialists in this case include the Marine Biologists, Soil Scientists, Health and Safety experts, and Micro Biologists who undertake scientific investigations to ascertain the degree of pollution; loss of aquatic lives; loss of economic trees, crops; predict possible recovery period and remediation actions and the cost implications. The results of these laboratory/scientific investigations and/or medical examination provide the valuer authentic data for his valuation. In the absence of such specialists' reports or inputs, the Valuers' assessments would be nothing but speculative and superfluous. It has therefore become an accepted practice in the market place to hire trained and experienced professionals to conduct the required environmental investigation and scientific tests including the stigma effect.

4th Step – Collating the ‘Heads of Claim’ and corresponding claimants.

Step four is concerned with collating liabilities usually referred to as the ‘heads of claims’ following the various enumerations, inventories, scientific investigations, and whatever remediation measures that might have been carried out in step three above. With these results and in the light of relevant statutes and civil laws, the Valuer is in a position to ascertain both total and partial loss; financial, legal and third-party liabilities; residual contamination, stigma etc. which he requires to ascertain ‘heads of claim’ and the distribution of liabilities and claims.

5th Step – Choosing the appropriate method(s) of valuation.

Step five is where the actual valuation takes place. The universal basis of valuation for compensation is obtaining a cash payment that would reasonably restore the claimant to status quo; that is, put the claimant virtually in the same position as before the incidence. The Valuer prepares his valuation estimate based on the data already gathered and in line with the professional standards and ethics; enabling statute and relevant professional standards. The major decision at the stage is the choice of appropriate method (s) of valuation. Options include direct market-based methods (cost, income capitalization or comparative) or the non-market methods comprising of ‘stated preferences’ which use statements about intended future behaviour to draw conclusions about total economic values such as the contingent valuation and conjoint analysis or, ‘revealed preferences’ such as hedonic pricing, which measures the value of an environmental asset by the estimated change in the value of a traded good as a result of the provision of the environmental asset, and, the travel cost method, whereby the value of an environmental asset is approximated by the willingness to pay of individuals to use the asset expressed in the costs incurred in travelling to the asset, or as is often the case, a combination of these. The ultimate choice of appropriate method or combination of methods is dictated by the nature of the valuation assignment, the intended use of the valuation results, the nature of the property, the nature and impact of contamination, education levels of respondents and particularly, the quality and quantity of available data, among others.

6th Step – Reconciliation of value indications and obtaining tentative final opinion of value.

Step six is the reconciliation of value where the Valuer has used alternative or varieties of methods to improve the reliability of his final value estimates. Each of the valuation methods used will most likely provide different indications of value; which need to be reconciled. The valuer uses reconciliation criteria to form a meaningful, defensible, and credible final value conclusion (The Appraisal Institute, 2008). Reconciliation does not suggest finding an ‘average’; as an average, in this instance, has no meaning or relevance as far as the market perception is concerned. Reconciliation actually implies that the Valuer sits back and reflect on the valuation assignment, the data used, the various circumstances surrounding the valuation; and then decide on which of the method or combination of method (s) best represents the situation and perception of the local market. The valuer considers the appropriateness of the approaches, the accuracy of the data and calculations, and the quantity or sufficiency of the evidence presented relative to specific valuation problem under consideration. The ultimate goal of the reconciliation exercise is to ensure thee accuracy, consistency, and the logic leading to the value indications. Appropriateness, accuracy, and quantity and quality of evidence are the criteria with which a valuer forms a meaningful, defensible final opinion of value (The Appraisal Institute, 2008). The effectiveness of integrating all the elements in the valuation process and coming up with a reliable value estimate depends on the analytical skill, experience, integrity, and judgment of the valuer.

7th Step – Quality assurance or quality control.

Step seven has to do with quality control which refers to a system that ensures that only proven and diligently prepared valuations pass through the system. Quality control, for instance, answers the questions:

- i) was the valuation carried out by qualified and experienced Valuer?
- ii) was the valuation peer reviewed?
- iii) was the valuation report was discussed on the floor of the valuation unit or department before they are sent out of the system?
- iv) did the valuations pass through the desk of senior Valuers with several years of experience before they are finally sent out?
- v) were technical specialists brought in at the appropriate steps to assist the Valuer in certain specialized area of a valuation assignment. Does the valuation report cover the reputation, competence, and the degree of independence of such specialists, including how the contribution of the specialists has influenced his valuation opinion?
- vi) does the report fulfil its purpose?
- vii) does the report answer and communicate the value question the Valuer is trying to establish convincingly, objectively, transparently, and precisely?
- viii) are all the illustration/figures/charts etc. clearly labelled, have appropriate/precise titles?
- ix) is the link between the main report and the diagrams, figures etc. clear?
- x) Can tables be easily interpreted?
- xi) Are graphs, pictures, layout, drawings and the likes correctly and appropriately labelled as e.g. Figure 1 (or Fig. 1); Figure 2 (or Fig. 2).

Step seven includes a loop generated to reconnect with step three. The purpose of the searching questions at this step is to ascertain that all relevant issues have been appropriately addressed, necessary investigations have been carried out, all required data collected, or to discover if any issues or steps in the valuation process have been wittingly or unwittingly compromised or somehow deficient and need to be rectified to improve the reliability of the ultimate assessment.

8th Step – Final report of defined value (compensation).

The last step, the eighth step, is to effectively communicate the report to the client or end-user. According to International Valuation Standard Committee, the style, form, contents and length of valuation reports are dictated primarily by the combination of client's and legal requirements, property type, and the nature and complexity of the valuation job (IVSC, 2003). In any case, all materials included in the report, either in the descriptive part or as appendix/addenda, must be relevant to the valuation assignment and properly mentioned and appropriately referenced in the report. The report must not be speculative but conclusive; not hypothetical or presumptuous but based on concrete facts. The report should demonstrate a transparent process of reasoning which shows that the opinion expressed is wholly or substantially based on specialized knowledge as applied to the facts (assumed or observed); and with due regard to intended use and user.

CONCLUSION AND RECOMMENDATION

The study proffers alternative valuation process for assessing compensation for oil spillage to what is presently available and employed by real estate valuers in the Niger Delta areas of Nigeria. Extant empirical studies have associated the spade of inaccurate and unreliable assessment of compensation for oil spills by valuers in the study area, in part, to procedural deficiency leading to compensation that are controversial. The underlying goals of the proffered valuation process include transparency, objectivity, consistency and traceability, which are regarded as the universal hallmark of reliable pricing (valuation). The process ensures that relevant issues together with their cost implications are adequately considered and accommodated. The resultant valuation or assessment is expected to prove more reliable and less controversial and therefore enjoy wider acceptability among the key stakeholders with its social and economic implications. The study also clearly revealed that valuation for compensation for environmental pollution, particularly, oil spills, is multi-faceted, multi-dimensional and multi-disciplinary in nature.

By proffering a valuation process that particularly has the assessment of compensation for oil spills as the basis, the research helps to address a fundamental procedural problem in valuation for compensation in the study area. This is expected to go a long way to enhancing valuers' skill, confidence and professionalism; restore the integrity and reputation of the valuation profession in the study area; foster the development of local standards and benchmarking; and incorporate new insights into valuers' professional practice particularly in this specialized aspect of the valuers' professional calling. This will ultimately ensure that victims of oil spills obtain reasonable and fair judicial redress and compensation in as short a time as is possible and at minimum cost. Though old habits die hard, but as Baum and Crosby (1998) posited "Valuers will change in their attitudes and techniques if a long substantial argument is put forward from a logical platform".

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Occupational Safety and Health (OSH) Concept Towards Project Performance

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ABSTRACT

Construction industry is one of the highest incidences after manufacturing industry and also the third biggest contributor to accident cases in Malaysia which making the industry deemed unsafe. The purpose of this research is to identify the causes and effect of construction accident and the impact of occupational safety and health (OSH) concept to project performance. This research is using questionnaire survey method of data collection to 72 respondents from G7 contractors which presenting 75 percent of response rate that involved in the construction of high rise building in Selangor. From the survey, finding shows major factors of construction accident consist of eleven (11) factors that been divided into four (4) main factors (i.e. Human; Worksite; Organization and Management; and External). Moreover, effect of construction accident includes loss ability to work lead to decrease and loss of individual/family income and standard of living, work disruption, delay of work progress, loss of time in project execution, need extra health and safety compliance work, company reputation and image, damages of plant and equipment, property and asset, increase of fine and legal expenses, and loss of productivity. Furthermore, most of the respondents also strongly agree with all statement impact of occupational safety and health (OSH) concept to project performance which include increase workers productivity, reduce rate of construction accident and injuries, increase safety at construction site, improve efficiency, human relations, increase profit, company reputation, business performance, reducing of penalties, insurance premiums and employment costs, quality of product, job satisfaction, morale of the workers, costs saving, and enhancement of project performance. The finding results of this research may contribute in reducing the number of accidents at workplace and assist in designing effective solutions of construction accident.

Keywords: *Construction accident; Occupational Safety and Health Concept; Project performance*

INTRODUCTION

Construction industry is a most hazardous industry. According to Construction Industry Development Board (2019), construction industry is one of the highest incidences after manufacturing which making the industry deemed unsafe. Occupational accidents in the construction industry are frequent, and may lead to permanent disabilities and a high rate of fatalities (Nadhim, Hon, Xia, Stewart, & Fang, 2016). Therefore, due to high number of construction accidents and the consequences of this has for workers, organization, society and countries, occupational safety and health (OSH) has become a very important issues for all stakeholders (Suarez, Carvajal, & Alis, 2017). According to Muttalib (2016), there are 420 workers were involved in construction accidents between 2011 and October 2016; whereby from January to October 2016, 55 workers were killed and 95 others were injured. Construction site is defined as any site at which any of the processes or operations of a construction are carried on (Dias, 2009).

According to Dias (2009), there are enough laws and regulations on OSH in construction industry around the world, however there is a failure to implement these laws and regulations.

There are many factors contributed to construction accident which include human factor, worksite factor, organization and management factor, and also external factor (Jaafar et al., 2018). However, Promsorn, Sopsakulrat, Adulyanukosol, and Kaiyarit (2015) state that factor contribute to construction accident were inappropriate ergonomic design environment and supporting policy. Construction accident undoubtedly will affect the performance of construction project. In addition, unsafe acts and unsafe condition are also one of the factors that may contribute to construction accident (Abdelhamid & Everett, 2000).

The effects of construction accident can be divided into two which are economic impact and social impact (Mthalane, Othman, & Pearl, 2008). Moreover, Heather Cormack, Steve Cross, and Claire Whittington (2006) proved that construction accidents will also affect psychological and behavioural of the workers. Besides that, accident that happened at construction site will cause the delay in construction progress and completion which related to time factor in project performance (Nguyen, An, & Nguyen, 2014).

Furthermore, construction accident will also give an impact to project performance in term of indirect costs of workplace to the employer and employees due to increases of expenses that affect financial of project performance (Head & Harcourt, 2015). This is also supported by Ling (2014) where the safe and healthy workplace is important to protect workers and increase productivity. Therefore, when occupational safety and health (OSH) culture increase, the workplace injuries and accident can be reduced hence improve efficiency, productivity and business performance of the company (Ismail Abdul Muttalib, 2014). Thus, it is noteworthy to identify the cause and effect of accident on construction project and the impact of OSH concept to project performance.

LITERATURE REVIEW

Contributing factors to OSH accidents in construction industry

According to Jaafar et al. (2018), contributing factors to OSH accidents in construction industry can be divided into four main factors which consist of human factor, worksite factor, organization and management factor, and external factors as shows in Table 1.

Human factor that contribute to construction accident can be comprise in 4 element which are physical, experience, attitude and behaviour (Jaafar et al., 2018). Human factor includes the individual characteristics of the construction workers including their demography, level of knowledge, human behaviour and attitudes, physical characteristic and health condition of the workers (Nadhim *et al.*, 2016). Besides that, Hong & Gui (2017) found that careless and unsafe acts among the workers in doing their work (Kadiri *et al.*, 2014; Yusof, 2019), insufficient training on workers, lack of safety awareness (Goh *et al.*, 2016) and improper use of protection equipment (Kadiri *et al.*, 2014; Orji Solomon et al., 2016) were identified to contribution of nearly 80% of the construction accident.

Table 1: Contributing factors to OSH accidents in construction industry

Contributing factors to OSH accidents in construction industry	Author
Human Factor	(Abdelhamid & Everett, 2000; Chim, Chun, & Wah, 2018; Goh, Goh, Omar, Toh, & Mohd Zin, 2016; Hong & Gui, 2017; Jaafar et al., 2018; Kadiri et al., 2014; Kilani, 2011; Nadhim et al., 2016; Orji Solomon, Enebe Eucharia, & Onoh Felix, 2016)
Worksite Factor	(Charehzezi & Ahankoob, 2012; Chim et al., 2018; Goh et al., 2016; Jaafar et al., 2018; Mutallib, 2014; Nadhim et al., 2016; Promsorn et al., 2015; Rahim, Hamid, & Singh, 2008)
Organization and Management Factor	(Abdelhamid & Everett, 2000; Chim et al., 2018; Jaafar et al., 2018; Kadiri et al., 2014; Mutallib, 2014; Nadhim et al., 2016; Orji Solomon et al., 2016; Yilmaz, 2015; Yilmaz & Alp, 2016)
External Factor	(Chim et al., 2018; Jaafar et al., 2018)

Worksite factor includes poor design and selection (Charehzezi & Ahankoob, 2012; Chim *et al.*, 2018). It is because accident could occur when there are defects in the work surface such as unprotected walkway, improper guardrails, slippery or sloped surfaces (Nadhim *et al.*, 2016). However Promsorn *et al.* (2015) stated that root cause of construction accident can be divided into three factors which are Ergonomic design (i.e. light, noise and vibration) (Charehzezi & Ahankoob, 2012); Supporting policy (i.e. training and technology); and Environment (i.e. weather and sunlight). In addition, worksite factor may also consist of jobsite conditions (Charehzezi & Ahankoob, 2012), poor site management (Charehzezi & Ahankoob, 2012; Goh et al., 2016; Jaafar et al., 2018; Mutallib, 2014; Rahim *et al.*, 2008), equipment and material (Charehzezi & Ahankoob, 2012) and construction task (Charehzezi & Ahankoob, 2012; Jaafar *et al.*, 2018).

Organization and management factor include policy (Charehzezi & Ahankoob, 2012), resource management, management culture and safety management which play a significant role in contribute to accidents in the construction industry (Jaafar *et al.*, 2018). Besides that, organization and management factor include negligence of contractor (Chim *et al.*, 2018), failure to enforce safety measures (Chim *et al.*, 2018), inadequate coordination, communication and supervision (Chim *et al.*, 2018; Kadiri *et al.*, 2014; Mutallib, 2014). Furthermore, companies might have improper safety measures/standard (Charehzezi & Ahankoob, 2012) such as insufficient/inoperative personal protective equipment (PPE) (Nadhim *et al.*, 2016; Yilmaz, 2015), defective safety belt/harness and lack of training courses (Goh *et al.*, 2016; Mutallib, 2014; Nadhim et al., 2016; Orji Solomon *et al.*, 2016) which may also contribute to construction accidents. Moreover, management procedure should be designed to identify and remove unsafe conditions in a proactive manner, and should always enforce the value and important of safety among workers (Abdelhamid & Everett, 2000).

According to Jaafar *et al.* (2018), external factor could be categorized as higher level that cause of occupational accidents and illnesses which are difficult to be identified through accident investigation that can be separated into three comprising of politics and legislation, economy, and also social aspects. Besides, previous research Chim *et al.* (2018) found that external factor include failure to comply with occupational safety and health act (OSHA).

Effect of Construction Accidents

Effect of construction accidents can be divided into three categories which include individual effect, company/business effect and project effect. Table 2 present a finding that found by previous researcher on the ten (10) individual effect of construction accidents. According to Chim *et al.* (2018), high accident risk results in workers' loss of confidence and low productivity. Besides that, construction accident is not only affect the victims but also may affect their family such as decrease family income (Head & Harcourt, 2015; Mthalane *et al.*, 2008; Pezzullo & Crook, 2006), decrease standard of living (Mthalane *et al.*, 2008), increase debt (Mthalane *et al.*, 2008) and difficulty in pay bill or policies bond (Head & Harcourt, 2015; Pezzullo & Crook, 2006; Thye, 2012).

Table 2: Individual effect of construction accidents

Individual effect of construction accidents	Author
Decrease family income	(Asanka & Ranasinghe, 2015; Head & Harcourt, 2015; Mthalane <i>et al.</i> , 2008; Pezzullo & Crook, 2006)
Decrease standard of living	(Mthalane <i>et al.</i> , 2008)
Increase debt	(Mthalane <i>et al.</i> , 2008)
Medical payment/expenses	(Arunkumar & Gunasekaran, 2018; Asanka & Ranasinghe, 2015; Head & Harcourt, 2015; Pezzullo & Crook, 2006; Thye, 2012)
Family depression	(Mthalane <i>et al.</i> , 2008)
Loss of social welfare	(Mthalane <i>et al.</i> , 2008)
Loss quality of life	(Head & Harcourt, 2015; Mthalane <i>et al.</i> , 2008; Pezzullo & Crook, 2006)
Loss of income	(Asanka & Ranasinghe, 2015; Head & Harcourt, 2015; Pezzullo & Crook, 2006)
Loss of confidence and low productivity	(Arunkumar & Gunasekaran, 2018; Chim <i>et al.</i> , 2018)
Loss quality of life	(Mthalane <i>et al.</i> , 2008)

Furthermore, Table 3 present on the 15 of company/business effect due to construction accident that being specified by previous researchers. According to Chim *et al.* (2018),effect of construction accident to company/business include increase company expenses and financial losses due to property damages and removing cost, compensation and penalties from authorities (Rahim *et al.*, 2008).Besides that, construction company which synonymous with high accident tendency have a bad reputations in creating dissatisfaction among stakeholder and consequently become unattractive in their tendering (Chim *et al.*, 2018). This is also found by (Udo, Usip, and Asuquo (2016) which stated that accident happened on site may affect overall project cost, productivity and reputation of company. Furthermore, Sarkam *et al* (2018) stated that the outcomes of failing to meet deadlines are often severe and difficult to solve, causing losses for the client and worsening safety condition at the construction site. Besides, high number of construction accidents may bring economic slowdown (Chim *et al.*, 2018).

Table 4 presents five project effect of construction accident since the accident happened at construction site which include loss of time in project execution, delay of work progress, work disruption, loss of customer satisfaction and absenteeism among the workers. Minor and major accident happened will cause the workday losses to the project due to the investigation that need to be conducted by responsible parties (Yilmaz, 2015). Therefore, delay in completion may cause of cost overrun and loss of profit due to liquidate and ascertained damages and other expenditure incurred due to accident happened (Asanka & Ranasinghe, 2015; Chim *et al.*, 2018). Moreover, the effect of accident that cause absenteeism of workers(Durdyev, Omarov, & Ismail, 2017; Pezzullo & Crook, 2006) will lead to delay on construction work progress (Kilani, 2011; Nguyen *et al.*, 2014; Udo *et al.*, 2016) which cause of low performance of workers and consequently affect total duration of the project (Durdyev *et al.*, 2017).In addition, construction accidents happen on site may demotivate workers, disrupt site activities, and delay project progress (Udo *et al.*, 2016).

Table 3: Company/Business Effect of construction accidents

Company/Business Effect of construction accidents	Author
Company reputation	(Arunkumar & Gunasekaran, 2018; Chim <i>et al.</i> , 2018; Pezzullo & Crook, 2006; Udo <i>et al.</i> , 2016)
Extra OSH compliance work	(Adams <i>et al.</i> , 2002; Arunkumar & Gunasekaran, 2018)
Loss of business	(Adams <i>et al.</i> , 2002; Mthalane <i>et al.</i> , 2008)
Increase expenses	(Adams <i>et al.</i> , 2002; Arunkumar & Gunasekaran, 2018; Chim <i>et al.</i> , 2018; Head & Harcourt, 2015; Pezzullo & Crook, 2006)
Fines and legal expenses	(Asanka & Ranasinghe, 2015; Head & Harcourt, 2015; Mthalane <i>et al.</i> , 2008; Rahim <i>et al.</i> , 2008)
Increase insurance cost	(Asanka & Ranasinghe, 2015; Mthalane <i>et al.</i> , 2008; Pezzullo & Crook, 2006)
Depression of employees	(Mthalane <i>et al.</i> , 2008)
Damages of plant and equipment, property and asset	(Adams <i>et al.</i> , 2002; Asanka & Ranasinghe, 2015; Charehzehe & Ahankoob, 2012; Kilani, 2011; Mthalane <i>et al.</i> , 2008; Pezzullo & Crook, 2006; Rahim <i>et al.</i> , 2008)
Legal penalties	(Adams <i>et al.</i> , 2002; Asanka & Ranasinghe, 2015; Chim <i>et al.</i> , 2018; Mthalane <i>et al.</i> , 2008; Rahim <i>et al.</i> , 2008)
Investigation cost increase	(Asanka & Ranasinghe, 2015; Pezzullo & Crook, 2006; Yacob, Saruwono, & Ismail, 2017)
Decrease of productivity	(Chim <i>et al.</i> , 2018; Head & Harcourt, 2015; Kilani, 2011; Thye, 2012)
Loss of production	(Adams <i>et al.</i> , 2002; Charehzehe & Ahankoob, 2012; Kilani, 2011; Mthalane <i>et al.</i> , 2008)
Decrease worker morale	(Adams <i>et al.</i> , 2002; Charehzehe & Ahankoob, 2012; Chim <i>et al.</i> , 2018; Kilani, 2011; Mthalane <i>et al.</i> , 2008; Thye, 2012; Udo <i>et al.</i> , 2016)
Decrease work quality	(Thye, 2012)
Dissatisfaction among stakeholders	(Chim <i>et al.</i> , 2018)

Table 4: Project effect of construction accidents

Project effect of construction accidents	Author
Loss of time in project execution	(Arunkumar & Gunasekaran, 2018; Asanka & Ranasinghe, 2015; Chim <i>et al.</i> , 2018; Durdyev <i>et al.</i> , 2017; Udo <i>et al.</i> , 2016)
Delay of work progress	(Asanka & Ranasinghe, 2015; Chim <i>et al.</i> , 2018; Durdyev <i>et al.</i> , 2017; Mthalane <i>et al.</i> , 2008)
Work disruption	(Kilani, 2011; Mthalane <i>et al.</i> , 2008; Udo <i>et al.</i> , 2016)
Loss of customer satisfaction	(Mthalane <i>et al.</i> , 2008)
Absenteeism	(Durdyev <i>et al.</i> , 2017; Pezzullo & Crook, 2006; Udo <i>et al.</i> , 2016)

Impact of Occupational Safety and Health (OSH) Concept to Project Performance

Safe and healthy workplace environment are important to protect employees and increase productivity (Ling, 2014). According to Thye (2015), development of string safety and health cultures at the workplace will have a greater impact on reduction of construction accident. Productivity was being measured by evaluating the production due to unfavourable working environment and delay occasioned by unclear safety and health guidelines (Getanda, 2015). Occupational safety and health concept include laws, regulations, standards, guidelines, specifications and other documents (Dias, 2009). According to Berman (2015), project performance can be measured by producing an effective result which result in productivity, avoidance of waste (Thye, 2016) in fraud which can helped in cost reduction; and by professional outlook of managers and their employees in the intrinsic satisfaction which interrelated to job satisfaction. In addition, Han, Saba, Lee, Mohamed and Pena-Mora (2014) stated that a successful construction project must meet performances and delivery requirement for time, cost, quality and safety.

Poor workplace health and safety will cause of increasing penalties from prosecutions for breaches of workplace safety and health laws, increase insurance premiums, and increase employment cost (Heaney & Irlight, 2010). Furthermore, lower turnover, reduce absenteeism and high productivity hereafter increase company profit will be achieved by having an effective OSH programme and development of OSH teams (Zakaria, 2012). Ergonomic program in safety and health can helped in reducing construction accident and injuries besides increase productivity and efficiency of work, quality of product and also morale of the workers (Thye, 2012). Besides that, ergonomic implementation in workplace health and safety is necessary for the improvement of productivity and efficiency in order to increase the reputation of company (Peter Gahan & Evans, 2014).

METHODOLOGY

This research aims to identify the effect of accident and the impact of Occupational Safety and Health (OSH) concept to project performance. There are two types of method that been used in completing this study which are primary data and secondary data. The primary data of this research utilised quantitative method of data collection by means of questionnaire survey to 72 respondents from G7 contractors which presenting 75 percent of response rate that involved in the construction of high rise building in Daerah Petaling, Selangor. Selangor has been selected as a sample of this research due to the highest number of workplace fatal accident and the highest number of notices being issues by DOSH to the workplace/ plant/ substance/ process that may pose an immediate danger in Selangor state. In addition, this research was using Statistical Package for the Social Science (SPSS) software for statistical method analysis of questionnaire survey that include Descriptive method and Likert rating scale of data analysis. Besides that, the secondary data been collected by document analysis from Department of Occupational Safety and Health (DOSH) and reading material such as journal, books, articles, newspaper and others in order to enhance and consolidate knowledge base and helps to integrate the research finding with the existing body of knowledge besides being used to integrate the research finding to either support or contradict the previous research.

RESULT AND DISCUSSIONS

Table 5 and Table 6 illustrates the respondent's job designation and respondent's years of experiences for questionnaire survey. In overall of questionnaire survey that involving 72 respondent, 59.7 percent of the respondent are from executive level such as Project Manager, Site Engineer, Health and Safety Officer and others (i.e., Architect Coordinator, Safety Coordinator and Quantity Surveyor). Furthermore, from the Table 6, it can be determined that there are 43 percent of respondent have more than 5 years of experiences in construction of high-rise building. Therefore, it is shows that the data collected are qualified as the respondent are the person that involved directly at the construction site and provide a good spread of personal experience in the sample.

Table 5: Respondent's Job Designation

Job Designation	Frequency	Percentage (%)
Project Manager	9	12.5
Site Engineer	17	23.6
Health and Safety Officer	12	16.7
Site Supervisor	15	20.8
Safety Site Supervisor	14	19.4
Others	5	6.9
Total	72	100.0

Table 6: Respondent's Years of Experiences

Years of Experiences in High-rise Construction	Frequency	Percentage (%)
Less than 1 year	15	20.8
2-5 years	26	36.1
6-10 years	16	22.2
11-15 years	7	9.7
More than 15 years	8	11.1
Total	72	100.0

Factor Contribute to Accident on Construction Project

From the survey result, it can be determined that there are four factors contribute to accident on construction project including human factor, worksite factor, organization and management factor and external factor. However, Table 7 shows there are 48 respondents (66.7%) point out that human factor is the most contributing factor that may lead to the accident on construction project. This is in line with the previous research conducted by (Goh *et al.*, 2016; Heather Cormack *et al.*, 2006; Hong & Gui, 2017; Kadiri *et al.*, 2014; Orji Solomon *et al.*, 2016; Soltanzadeh, Mohammadfam, Moghimbeigi, & Akbarzadeh, 2016; Yusof, 2019).

Table 7: Main factor contribute to accident

Main factor contributes to accident	Frequency	Percentage (%)
Human Factor	48	66.7
Worksite Factor	17	23.6
Organization and Management Factor	5	6.9
External Factor	2	2.8
Total	72	100.0

Table 8 shows result analysis of four factors that contribute to accident happened at construction project. Human factor consists of careless among the workers (65.3%), improper use of PPE (59.7%), unsafe acts (55.6%), and lack of safety awareness (51.4%).

Table 8: Factor contribute to accident on construction project

Factor contribute to accident on construction project	Frequency	Percentage (%)
Human Factor		
Careless among the workers	47	65.3
Improper use of PPE	43	59.7
Unsafe acts	40	55.6
Lack of safety awareness	37	51.4
Worksite Factor		
Unsafe condition	46	63.9
Unsafe actions	46	63.9
Poor safety practice	40	55.6
Unsuitable tools and equipment	36	50.0
Organization and Management Factor		
Lack of knowledge/incompetency	47	65.3
Lack of supervision / monitoring	40	55.6
External Factor		
Regulatory	44	61.1

Moreover, worksite factor that contribute to construction accident as agreed by respondent consist of unsafe condition (63.9%), unsafe actions (63.9%), poor safety practice (55.6%) and unsuitable tools and equipment (50.0%). Similar high response percentage of unsafe condition and unsafe actions has demonstrated that these two factor are the major worksite factor to construction accident. This result is similar with the previous research finding conducted by Irumba and Wilhelmsson (2014); Rahop (2016); Thye (2016); and Yilmaz and Alp (2016). Furthermore, based on organization and management factor, lack of knowledge/incompetency (65.3%) and lack of supervision / monitoring (55.6%) may be factor that contribute to construction accident. This survey results also similar with previous research done by Irumba and Wilhelmsson (2014); Mutallib (2014); Thye (2016); and Yilmaz and Alp (2016) who found that lack skill and experiences among construction workers is the most factor that may lead to the construction accident. Lastly there are 44 respondents (61.1%) indicated that regulatory is the most external factor that usually may contribute to accident at construction site. This result also supported by the research done by Zahoor, Chan, Gao, & Utama (2017) which found that major reason for non-adherence are include non-enforcement of existence regulatory.

Effect of Accident on Construction Project

Table 9 present three effects of accidents on construction project that clarified by all of the 72 respondents which include individual effect, project effect, and organization/business effect. The survey result shows that the respondents are strongly agree with individual effect of construction accident that cause of loss ability to work which may lead to decrease and loss of individual/family income and standard of living ($M=4.19$). This result is similar with the research done by Head and Harcourt (2015) and Pezzullo and Crook (2006) which found that the economic effect of site accident may affect the individual and family that consists of decrease family income and decrease standard of living. Additionally, Mthlane, Othman, and Pearl (2008) previous research also found that the decrease in standard of living is ranked the highest economic effect on the affected families and construction companies respectively that cause by site accidents with mean of 4.6 and follow by decrease in family income in second rank with mean score of 4.

Table 9: Effect of accident on construction project

Effect of accident on construction project	Mean
Individual Effect	
Loss ability to work lead to decrease and loss of individual/family income and standard of living	4.19
Project Effect	
Work disruption	4.22
Delay of work progress	4.21
Loss of time in project execution	4.21
Organizational /Business Effect	
Need extra health and safety compliance work	4.26
Effect company reputation	4.24
Damages of plant & equipment, property and asset	4.19
Increase of fine & legal expenses	4.01
Decrease and loss of productivity	4.00

Furthermore, result shows that the project effects of accidents on construction project include work disruption (M=4.22), delay of work progress (M=4.21) and loss of time in project execution (M=4.21). This result is similar with previous research by Durdyev, Omarov, and Ismail (2017); Kadiri et al. (2014); Kilani (2011); Mthlane et al. (2008); Nguyen, An, and Nguyen (2014); Peter Gahan and Evans (2014); and Yilmaz (2015). Besides that, construction accident also will effect organization and business of the company such as the need for extra health and safety compliance work (M=4.26), company reputation (M=4.24), damages of plan and equipment, property and asset (M=4.19), increase of fine and legal expenses and decease (M=4.01) and loss of worker's productivity (M=4.00).

Impact of Occupational Safety and Health (OSH) Concept to Project Performance

Table 10 shows the impact of occupational safety and health (OSH) concept to project performance. This survey result shows that the most of the respondent are strongly agree with the impact of occupational safety and health (OSH) concept to the performance of construction project. This finding includes safety and health workplace important in order to increase productivity (M=4.47) and low accident happened will indicate to the high productivity of the workers (M=4.39). This is similar with the findings of previous research by Ling (2014); and Thye (2016).

Besides that, the finding also found that Poor site condition affects labour productivity at construction site (M=4.38), therefore the respondent also agreed that health and safety factor may affect the performance of construction project (M=4.28) which similar as stated by Thye (2016). The result also shows that respondents are strongly agreed with the statement of construction accidents has a relationship with project performance (M=4.26) which is supported by previous researches conducted by Asanka & Ranasinghe (2015); and Han, Saba, Lee, Mohamed, and Pena-Mora (2014). Additionally, this result also found a similar findings with Zakaria (2012) in term of when the OSH culture and programmed increases, the workplace injuries can be reduce as well as improve the efficiency, productivity, profit and business performance (M=4.25).

Table 10: Impact of occupational safety and health (OSH) concept to project performance

Impact of occupational safety and health (OSH) concept to project performance	Mean
Safety and health workplace important in order to increase productivity	4.47
Low accident happened will indicate to the high productivity of the workers	4.39
Poor site condition affects labour productivity at construction site	4.38
Health and Safety factor affect performance of construction project	4.28
Construction accident has a relationship with project performance	4.26
When the Occupational Safety and Health (OSH) culture and programmed increases, the workplace injuries can be reduced as well as improve the efficiency, productivity, profit and business performance	4.25
If the workplace health and safety practice improve, it will be held in reducing of penalties, insurance premiums and employment costs.	4.25
Ergonomic program helped in reducing the accident and injuries besides increase of productivity, efficiency of work, quality of product and morale of the workers.	4.22
Poor practice of workplace health and safety drive to the reducing of business potential profit and reputation losses.	4.07

Furthermore, respondents also strongly agreed that if the workplace health and safety practice improve, it will be held in reducing of penalties, insurance premiums and employment costs (M=4.25) which similar to research finding by Choi (2006). Apart from that, ergonomic program also may help in reducing the accident and injuries besides increase of productivity, efficiency of work, quality of product and morale of the workers (M=4.22). These finding results also similar with previous research conducted by Peter Gahan and Evans (2014); and Thye (2012) which found that ergonomic programmes are important to increase productivity, efficiency, quality and morale of the workers. Finally, poor practice of workplace health and safety drive to the reducing of business potential profit and reputation losses also strongly agreed by the respondent (M=4.0) which also supported by Peter Gahan and Evans (2014) that highlight a healthy and safe workplace will initiate to the increase of reputation and profit of the company.

CONCLUSION

In conclusion this research is based on the findings and analysis that being summarize based on the research objectives. This research study on the factor contribute to construction accident, effect of accident on construction project and the impact of occupational safety and health (OSH) concept to project performance. This research obtains the views of contractors that involved 72 samples of respondent with 75 percent of respond rate for the outcome of project especially in high rise building construction project. Research finding shows the major factors of construction accident consist of careless among the workers, improper use of personal protective equipment (PPE), unsafe acts, lack of safety awareness among workers, unsafe condition, unsafe action, poor safety practice, unsuitable and improper use of tools and equipment, lack of knowledge and incompetency, lack of supervision and monitoring and lack enforcement of safety policy and regulations.

Furthermore, effect of accidents on construction project include loss ability to work lead to decrease and loss of individual/family income and standard of living, work disruption, delay of work

progress, loss of time in project execution, need extra health and safety compliance work, effect on company reputation and image, damages of plant and equipment, property and asset due to accident, increase of fine and legal expenses, and decrease and loss of productivity. In addition, most of the respondents also strongly agree with the statement impact of occupational safety and health (OSH) concept to project performance include increase productivity of the workers, reduce rate of construction accident and injuries, increase safety at construction site, improve the efficiency, human relations, increase profit, company reputation, business performance, reducing of penalties, insurance premiums and employment costs, quality of product, job satisfaction, morale of the workers, costs saving, and facilitated to the enhancement of project performance.

Therefore, the finding result of this research may contribute in reducing the number of accidents at workplace and assist in designing effective solutions of construction accident. However, this study is limited to small sample size due to limitation of time that cause a limited ability to generalize result to the entire construction industry especially in construction of high rise building which highly root to accident in construction industry. Thus, as future development and due to the fact that complexity and extension of construction project are increasing, it is recommended to study more details on the cause of accidents in order to find the best solution for the problem hence improve occupational safety and health on construction project. Besides that, it is also suggested to further research and study more details on the impact of occupational safety and health (OSH) concept to project performance by using the mix of qualitative and quantitative data collection in order to strengthen the validity and rationality of the implication.

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The first page of the manuscripts must contain the full title, name of author(s), designation(s) of affiliation(s), highest academic qualification and the present address(es) with the telephone/fax/e-mail contact information listed.

Abstract and Keywords

The abstract must not exceed 250 words and should summarise the paper including the main conclusions. There shall be not more than 5 keywords.

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Book

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Conference Proceeding

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