

# THE NEED FOR STANDARDISATION OF PLANT AND MACHINERY VALUATION PRACTICES IN MALAYSIA

Abdul Rahman Mohd Nasir  
National Property Information Centre (NAPIC)  
Valuation and Property Services Department  
Ministry of Finance, Malaysia  
Email: arahman@jpph.gov.my

Professor Chris Eves  
School of Civil Engineering and The Built Environment  
Science and Engineering Faculty  
Queensland University of Technology  
Brisbane, Australia  
Email: chris.eves@qut.edu.au

## ABSTRACT

This paper investigates the international best practices of plant and machinery valuation and to establish the common valuation concept, awareness and application of valuation methodology and valuation process for plant and machinery valuation in Malaysia. Using a qualitative approach, the content analyses were conducted from the international practices and current Malaysian implementation of plant and machinery valuation. A quantitative approach, via questionnaire, was distributed amongst the registered and probationary valuers in Malaysia to investigate their understanding and opinion relating to plant and machinery valuation based on their current practices. The significance of this research is the identification of international plant and machinery practices and the understanding of current practices of plant and machinery valuation in Malaysia. It found the main issues impacting on plant and machinery valuation practices in Malaysia are the limited numbers of resources available either from scholars or practitioners. This is supported by the findings from the research survey which indicates that there are immediate needs for practical notes or guidelines to be developed and implemented to support the Malaysian valuers practising plant and machinery valuation. This move will lead to a better understanding of plant and machinery valuation, reducing discrepancies in the valuation of plant and machinery and increased accuracy among practising valuers.

**Keywords:** Plant and machinery, plant and machinery valuation, best practices, plant and machinery valuation concept and process, plant and machinery valuation application.

## 1.0 Research Background

Globally, plant and machinery valuation is not a popular profession compared to land or building valuation even though the size and value of the plant and machinery can contribute up to 80% of the company's total assets. In Malaysia, a plant and machinery valuation report is required if the companies rely on the market value approach of accounting.

Previous studies show that the introduction of the 2005 International Financial Reporting Standard (IFRS) amendments, namely IFRS 116 for property, plant and equipment changes the way accountants treat the assets assessment (Christensen and Nikolaev 2009; Spies and Wilhelm 2005; Herrmann et al. 2006 ). The amendments require accountants to choose between Historical Cost approach and Market Value approach in assessing the present value of the client's assets. To arrive at the current present value of the assets, accountants choose Market Value to be implemented in the reporting sheet. This Market Value approach leads to the requirement of an independent valuer to assess the Market Value of the assets. The amendments have been applied in most countries including United Kingdom, Australia and Malaysia, one of the fastest developing nations in the world.

However, unlike land and building property valuation, plant and machinery transactions are often scarce and very limited resources exist in terms of information and comparison of data. For examples, the land and building sales transactions are registered with the National Property Information Centre (NAPIC) in Malaysia, while the

Commonwealth of Australia, Commonwealth Property Review Branch and Australian Government Property Office Occupancy Report compiles the registered sales transactions in Australia. Commercial properties are also captured in NAPIC database and RP Data Commercial databases in Australia and New Zealand. There is no official registered database for plant and machinery transaction, and normally the transaction is recorded only in the sales and purchase agreement between the dealing parties. With these difficulties, even valuers treat plant and machinery valuation as specialised property. Herrman et al. (2006) illustrated that this perception has led to the usual acceptance for Depreciated Replacement Cost method, which in most cases is accepted by accountants as Historical Cost.

The need for plant and machinery valuation to comply with the IFRS reporting standards has been a global issue. Previously, when it came to plant and machinery valuation for securing loan facilities, financial businesses have a sceptical view on the reliability of the valuation under the Market Value basis, and somehow were more comfortable with Historical Cost basis. In contrast Malaysian Institute of Accountants and Malaysian Accounting Standards Board (2010) under the Malaysian IFS 116 recognised plant & machinery element of identification for valuation purposes such as the cost of dismantlement, removal and restoration cost, exchanged of assets at Fair Value basis and components depreciation for plant and machinery.

In addition, the compliance of IFRS around the globe is varied. Herrmann et al. (2006) has examined the way the valuation of property, plant and equipment is conducted and compared with IFRS in five (5) countries as shown in Table 1.1 below:

Table 1.1: Valuation of property, plant and equipment across five countries and under International Financial Reporting Standards (IFRS)

Item/ Countries	Australia	UK	NZ	Japan	USA	IFRS
Valuation Basis	Cost or fair value	Cost or fair value	Cost or fair value	Cost	Cost	Cost or fair value
Independent valuation required for revaluation	No	No	Yes	Not available	Not available	No

Source : Herrmann et al. (2005)

In Malaysia, the industry acceptance for plant and machinery valuation is varied from different institutions including bankers, accountants, auditors and valuers. To make the situation worse, the basis of valuation, method of valuation and reporting standards of plant and machinery valuation are different among the valuers themselves. Different interpretations on the premise of values results in the differences in methods of valuation, as well as the final determination of the value. The root of these problems stems back to the Malaysian Valuation Standards (MVS), which is silent on the plant and machinery valuation practical guidelines. Some other factors include:

- Different school of thought among the valuers, depends on the tertiary education background and working experience; and
- MVS, like other international standards, is more concerned with the process of valuation (French, 2003), and lacks interpretation and synchronisation of the basis of valuation and methods of valuation.

A comparison between MVS identification on plant and machinery valuation and the international standards related to plant and machinery valuation are shown in Table 1.2:

Table 1.2: Comparison between MVS and other international standards related to plant and machinery valuation

Parameter/ Key Area	International Valuation Standard Guidance Notes 3 (Proposed amendment 2011)	International Accounting Standard 16 (2005)	Australia & New Zealand Valuation & Property Standard 2009	Uniform Standard of Professional Standard Practices (2010/2011) USA	Malaysian Financial Reporting Standard 116 (2006)	Malaysian Valuation Standard
Definition :						
a) Plant	Yes	Yes	Yes	No	No	Yes
b) Machinery	Yes	Yes	Yes	No	No	Yes
c) Equipment	Yes	Yes	Yes	No	No	Yes
d) Market Value	Yes	Yes	Yes	Yes	No	Yes
e) Fair Value	Yes	Yes	Yes	Yes	Yes	Yes

Extension of Market Value Basis of Valuation (Premise of Value):						
a) Market Value In-Situ	Yes	Yes	Yes	Yes	No	No
b) Market Value Ex-Situ	Yes	Yes	Yes	Yes	No	No
c) Market Value as a whole for removal	Yes	Yes	Yes	Yes	No	No
Valuation Method for Plant & Machinery						
a. Market Comparison	Yes	Yes	Yes	Yes	Yes	No
b. Replacement Cost	Yes	Yes	Yes	Yes	Yes	No
c. Income	Yes	Yes	Yes	Yes	Yes	No
Standard of Reporting:						
a. Data description	Yes	Yes	Yes	Yes	No	No
b. Valuation report	Yes	Yes	Yes	Yes	No	No
Other relevant information:						
a. Cost of erecting, testing and commissioning	Yes	Yes	Yes	Yes	Yes	No
b. Cost of transportation / removal	Yes	Yes	Yes	Yes	Yes	No
c. Tax and duties						
d. Cost of decommissioning	Yes	Yes	Yes	Yes	Yes	No
	Yes	Yes	Yes	Yes	Yes	No

*Source: Author (Adopted from IVS 2010, IAS 2005, ANZVPS 2009, USPAP 2010, MFRS 2006 and MVS)*

Table 1.2 clearly shows that there is limitation in the MVS on how plant and machinery valuations are determined. In brief, a crucial problem to be addressed in this research is to investigate the international practices of plant and machinery valuation and the state of plant and machinery practices in Malaysia. By determining this, it can be used as a basis for the development of plant and machinery valuation practical notes and guidelines in Malaysia in the future.

## 2.0 Research Aim

This research aims to investigate the international practices of plant and machinery valuation and study the level of understanding and implementation of plant and machinery valuation in Malaysia. This will help towards the better understanding of the plant and machinery valuation principles and process, as well as creating common understanding among the valuers conducting plant and machinery valuation in Malaysia.

Currently, there has been no study conducted in Malaysia to examine the plant and machinery valuation implementation and the related jurisdiction involved. Even though the Malaysian Valuation Standards have outlined the plant and machinery interpretation, it does not cover on how to conduct the plant and machinery valuation especially on the valuation premise of value, valuation process and valuation reporting of plant and machinery. By nature, plant and machinery lacks information coverage and transparency. Therefore, it is important that this research will synchronise the international plant and machinery valuation practices with Malaysia current implementation.

## 3.0 Research Objectives

This study focuses on the following objectives:

- i. To investigate the international practices of plant and machinery valuation;
- ii. To establish the common valuation concepts, awareness and application of valuation methodology and valuation process for plant and machinery valuation in Malaysia. .

## 4.0 Plant and Machinery Valuation in Malaysia

The Malaysia Valuation Standards (MVS, 2006) applied the definition of plant and machinery consistent with the IVS. Plant, machinery and equipment are identified as building services installations and process plant, machinery and equipment installed wholly in connection with the occupier's industrial or commercial processes and also business occupation furniture and furnishings, fixture and fittings, vehicles, moulds and loose tools. It

also constitutes a class of property other than real property, and for accounting standards these are classified as tangible assets. They are individually distinguished and defined as follows:

- a. Plant includes assemblages of asset that may include specialised non-permanent buildings, machinery and equipment.
- b. Machinery includes individual machines or collection of machines. A machine is an apparatus using or applying mechanical power, having several parts each with a defined function, and together performing certain kind of work.
- c. Equipment includes ancillary assets that are used to assist in the functioning the function of the enterprise.

(MVS, 2006)

The Malaysian Accounting Standards Board (MASB) definition of plant, machinery and equipment is in line with the MVS and recognises plant, machinery and equipment as tangible assets. MASB (2010) definition of property, plant and equipment includes:

- a. are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes; and
- b. are expected to be used during more than one period.

## 5.0 International Practices for Plant and Machinery Valuation

### 5.1 Regulatory Framework

The regulatory framework plays a major role in the compatibility of the valuation methods for plant and machinery according to the IVS and IAS as it dramatically influences not only their flexibility, but also the consistency of their application (Spies and Wilhelm, 2005). In essence, most of the international standards provide sufficient elements of the regulatory framework (IVS 2010, IAS 2010 and USPAP 2010). UK and the United States standards differentiate between local and international valuation practices, however does not highlight the importance to synchronise between the methods of valuations and premise of value. The valuers/appraisers only need to justify any interpretation and usage of premise of value and methods of valuation in their valuation report.

Table 1.3: Summary of regulatory framework of plant and machinery valuation based from the International Standards

Standards	Comments/ Findings
International Valuation Standards (IVS)	IVS is managed by non-profit organisation in United Kingdom; consist of various nations in the board committee. It does not regulate any countries, but sets similar and consistent standards for nation standards to follow as a guideline. The IVS is a minimum bench mark, and will be assimilated into country standards for local adoption. For plant and machinery, it provides brief explanation on definitions, premise of value, methods and standards of reporting under IVS Guidance Notes 3.
International Accounting Standards (IAS)	IAS, governed by International Accounting Standards Board, provides standards for accountants and auditors to comply. For plant and machinery valuation, IAS recognised it as part of tangible assets in the financial sheet. The 2005 amendments provide more recognition to plant and machinery as it includes cost to install, erecting, maintaining and dismantle of plant and machinery to be part of tangible cost.
Uniform Standards of Professional Standard Practices (USPAP) – United States	USPAP are not only supported but also enforced by the government. It has been the de facto valuation standard in the United States. For plant and machinery valuation, it is prescribed as personal property, and the USPAP provides a general statement for the methods of valuation and how to conduct the valuation for plant and machinery. In general, the USPAP keeps the standards as general as possible, to make it manageable for users and valuers/ appraisers. It allows the appraisers to operate overseas.
RICS Red Book – United Kingdom	The Red Book is the basis for the IVS Structures. However, the standards address the differences between UK’s practices and international application in the forms of local laws and needs. For plant and machinery, it provides practical notes for better understanding.
Australia & New Zealand Valuation and	The regulatory body binds the local plant and machinery valuers, as Australia and New Zealand have different set of valuers, either land and building valuers, and plant

Property Standards (ANZVPS) – Australia & New Zealand	and machinery valuers. For plant and machinery valuation, the standards applied the IVS, and put some addition for local Australian and New Zealand practices.
Malaysian Valuation Standards (MVS) - Malaysia	The standards must be complied by valuers, and only registered valuers are allowed to do plant and machinery valuation. Even though there is explanation on the definition of plant and machinery, the standards lack of premise of value, and silent on how to synchronise between valuation premises and valuation methods.

*Source: Author*

Generally, the premise of value is the extension from the market value definition. In plant and machinery valuation, the use of premise of value is important to determine the nature of valuation undertaken and the right method of valuation to be employed. In the case of Malaysia, as it follows the UK's Red Book, the Malaysian Valuation Standards have explained the definitions and how to conduct the plant and machinery valuation for financial reporting. For the premise other than market value, valuers have to provide an explanation of the premise used. The tabulation of the international framework of plant and machinery valuation by international standards and Malaysian Valuation Standards are as follows:

## 5.2 Valuation Concept (Premise of Value) for Plant and Machinery Valuation

Sze (2006) claims that the main problem for the plant and machinery valuation is to standardise the usage of premise of value since it differs from one country to another. Some international standards do implement the extension of premise of value, and provide descriptions and definitions of Market Value In-Situ, Market Value Ex-Situ, and Market Value for Removal and others (IVS 2010, ANZPVS 2010). However, the United States provides different terms, implementation and understanding of premise of value such as Liquidation Value, Orderly Liquidation Value and Forced Liquidation Value (USPAP 2010).

However, all international standards, including MVS agree with the definition of Fair Value and Market Value. This is because most of the time, the term Fair Value and Market Value are accepted by other professions, namely accountants and auditors. The term Fair Value is accepted as equivalent to the Market Value (Christensen and Nikolaev, 2009). Even though there are similarities among the international standards to accept the definition of Market Value and Fair Value, the extension of the premise of value varies either from UK or the United States definition. The differentiation and application of premise of value being used are tabulated in Table 1.4 below:

Table 1.4: Summarisation of application of premise of value among the international standards

Premise of Value / International Standards	International Valuation Standards, Guidance Notes 3 (Proposed amendment 2011)	Uniform Standard of Professional Standard Practices (2010/2011) United States	Australia & New Zealand Valuation & Property Standard 2009	Malaysian Valuation Standard 2006
Market Value In-Situ	Yes	Yes	Yes	No
Market Value Ex-Situ	Yes	No	Yes	No
Market Value-Removal	Yes	No	Yes	No
Reproduction Cost New / Reinstatement New	No	Yes	No	No
Replacement Cost New	No	Yes	No	No
Fair Market Value In Continued Use	No	Yes	No	No
Fair Market Value – Installed	No	Yes	No	No
Fair Market value – Removal	No	Yes	No	No
Liquidation Value in Place	No	Yes	No	No
Orderly Liquidation Value	No	Yes	No	No
Forced Liquidation Value	No	Yes	No	No

*Source: IVS 2010, USPAP 2010, ANZVPS 2009 and MVS 2006*

From Table 1.4, it can be seen that term 'Market Value In-Situ' used in IVS and ANZPS is equivalent to 'Fair Market Value-Installed' used in USPAP. The problems lie in the premise of value which is not stated as equivalent, such as Liquidation Value in Place, Orderly Liquidation Value and Forced Liquidation Value. The

MVS is silent on all of these value premises. Therefore, this research is to address a common understanding of premise of value and methodologies to be applied in Malaysian plant and machinery valuation.

The IVS (2010), IAS (2005) and USPAP (2010) provide recognition on some elements or factors that constitute the market value of plant and machinery, such as cost of installation, testing and commissioning, cost of dismantling and cost of removal. However, there are no significance synchronisation in any of the international valuation standards, to link between different types of premise of value, factors affecting value and methods of valuation (Sze, 2006). The same situation happens in relation to the Malaysian Valuation Standards.

### 5.3 Plant and Machinery Valuation Methodologies

Korner (2009) and MacDonald (2001) describe that there are three internationally recognised approaches to value, namely market, income and cost approaches. Each has certain strengths and weaknesses, and their application depends on the purpose, type of property involved, nature of the market and availability of specific data that a valuer must consider in every project. It should be noted that that all of these approaches should reflect, when possible, market data. When a variety of information sources are relied upon, such as cost new of a plant, exchanges in used markets or a rate of return required by the investors, each should reflect the circumstances prevailing in a particular market at the valuation date. Theoretically, all methods should yield the same result, but in reality, this is often not the case. The valuer must reconcile the facts and circumstances applicable and consider the data, the premise of value and the assumptions employed (Korner, 2009).

### 5.4 Plant and Machinery Valuation Process

Table 1.5: Plant and machinery valuation process

Phase I : Site Inspection	Phase II: Research, Analysis and Value Determination
Verify or develop asset list.	Research new machinery cost.
Confirm or compile brand, model, serial number, description, configuration, condition.	Identify technological developments at variance to the subject assets.
Note special features, modifications or defects.	Develop replacement or reproduction cost as new.
Photographs key items or processes.	Research local secondary markets including rental, if any.
Investigate manufacturing layout, manufacturing capabilities, operating characteristic, maintenance program.	Analyse known sales.
Collect or develop process flowcharts and material flow diagrams.	Adjust new costs for physical condition and expected physical life.
Collect historical machinery purchase contract information and accounting data.	Adjust for technological variations and expected future advances.
	Adjust for economic factors pertinent to the industry.
	Develop values from cost and market approaches.
	Prepare draft reports and detailed schedule of assets.

Source: Maninggo (2010), Abdul Rahman (2010) and Mohd Khairuddin (2008)

Table 1.5 above explains the detailed process of plant and machinery valuation. It comprises two phases which are (a) Phase I: Site Inspection; and (b) Phase II: Research, Analysis and Value Determination. Phase I involves detailed data collection including data identification and data verification. Phase II is more related to the desk-top works which include research for new machinery cost, market analysis and value determination. These phases are based from the practitioners in the market and there are no standardisation and exact rules of how to implement the phases. The guidelines or practical notes are important in providing valuers in Malaysia with the fundamental knowledge for conducting plant and machinery valuation.

In regards to Malaysia, there are no guidelines or rules to be followed for the plant and machinery valuation process. There are limited Malaysian books or academic papers discussing the valuation process, and most likely the best reference comes from the practitioner in the market. However, it is subject to the experience and level of exposure to the specific industry that can determine the valuers' level of knowledge in conducting plant and machinery valuation. The gap keeps increasing every day, with the IFRS amendments in 2007. Therefore, there is a need for proper guidelines for plant and machinery valuation practitioners, to guide and equip them with the basic fundamentals of plant and machinery valuation to ensure compliance and acceptance by all end valuation users.

## 5.5 Standard of Reporting for Plant and Machinery Valuation

In general, there are slight differences on the plant and machinery valuation report compared to the normal real estate valuation report. The standards of reporting for plant and machinery valuation are more detailed, in terms of data information, regarding the asset being valued, the comparison being used and market analysis of specific industry.

Internationally, a standard of reporting is based on IVSC (2010) International Valuation Standard 3 – Valuation Reporting which should consider the followings; 1) Date of valuation, date of the report and date of the inspection, 2) Purpose and basis of valuation, 3) Property rights or interest to be value, 4) Physicals and legal characteristics of the property, 5) Scope of valuation, 6) Assumptions and limiting conditions, 6) Valuation Methodology, 7) Market analysis, 8) Value consideration, and 9) Valuer signature and professional qualification. This IVSC standard of reporting was accepted by most countries such as United Kingdom, Australia, New Zealand, India and others. The IVSC stated as a general guidelines, and the countries includes their addition to the IVSC version of standard of reporting to suite their country's needs.

In Malaysia, the MVS (2006) has outlined the contents of the real property valuation report that stated under MVS Standard 9 – Valuation Reports. The contents of a valuation report are set out in Table 1.6:

Table 1.6: MVS 9: Valuation report contents

Valuation Contents	
1. Instruction to value.	9. Planning details.
2. Interest to be valued.	10. Assumptions.
3. Purpose of valuation.	11. Method of valuation.
4. Date of valuation.	12. Evidences of value.
5. Date of inspection	13. Opinion of value.
6. Title particulars.	14. Name and signature of the Valuer.
7. Description of property – Neighbourhood, location, physical description of property, property condition, available services etc.	15. Plan – Building plans, location plans.
8. Tenancy/lease details.	

Source: MVS (2006)

In regards to plant and machinery valuation, the Malaysian Valuation Standards puts a minimum referencing for the reporting which is highlighted in MVS (2006) Standard 8, Item 2.2(g) which stated “*where the valuation includes plant, machinery and equipment, details such as brand name, model number, size, capacity, age and other identifying characteristics must be included in the report.*” These statements provide limited understanding on how the plant and machinery valuation report should be addressed.

The problem is not restricted to Malaysia. Many authors agreed that for plant and machinery valuation reporting, additional details should be considered and included (Maninggo, 2010; Abdul Rahman, 2010; Mohd Khairuddin, 2008; Barton, 2007 and Budhbhatti, 1999). These authors agree that the plant and machinery valuation report should include the Plant Valuation Schedule in the appendix section. This schedule is a detailed description of every machine being valued. Descriptions of the plant and machinery valuation report are set out in Table 1.7:

Table 1.7: Description of plant and machinery in valuation report

Addition to Normal Valuation Report Contents	Explanation
Nature of assets	Explaining the nature of assets, description of the purpose of machines, production capacity, age and condition of assets, average age and photographs of major components.
Basis of valuation (Premise of Value)	The report should explain clearly on the basis being employ, whether it is market value in-situ, market value remain in-situ or market value ex-situ. Even though all considered under market value, different premise of value provide different valuation methodology to employ.
Valuation Methodology	Detailing on the valuation methodology as the plant and machinery valuation should consider different approach within the same methodology. Example: Direct comparison method or percent of cost method under Market Approach.
Market Analysis	Descriptive studies or explanation on the specific industries should be highlighted considering the second hand market, average life span of plant

	or machinery, changes in technology and the use of machinery by other type of industries.
Plant Machinery Schedule	Determine the plant or machinery brand, model, serial numbers, capacity, asset descriptions and supporting equipments. It can include year of manufacture, asset age, estimated life, asset size, length or country of origin.

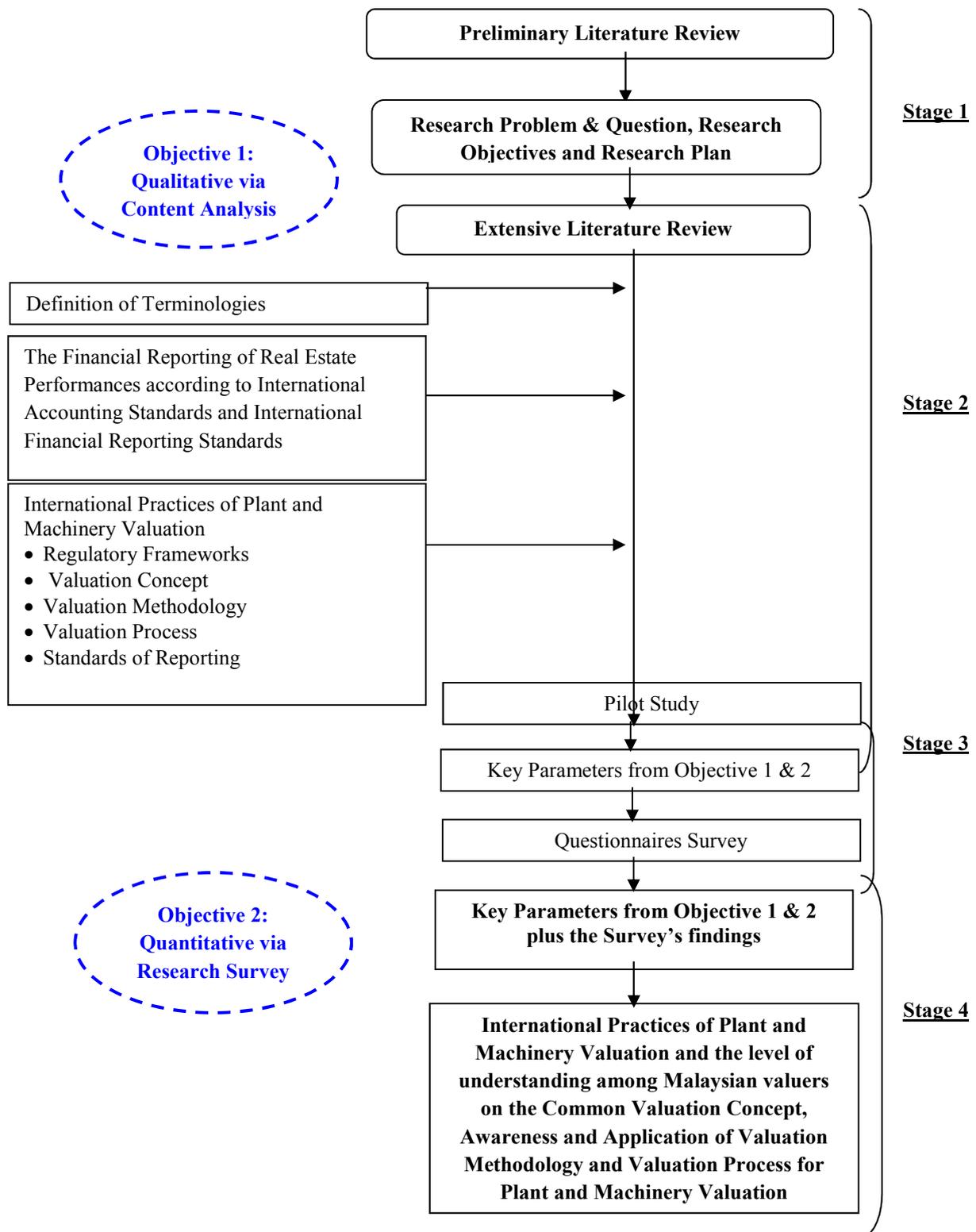
*Source: Maninggo (2010), Abdul Rahman (2010), Mohd Khairuddin (2008), Barton (2007) and Budhbhatti (1999)*

Most likely, it depends on the valuers experience and ability to explain the plant and machinery being valued in their reports. There are no strict guidelines on this matter, however standard guidelines in Malaysia will help current and new practitioners providing consistency in reporting plant and machinery valuation, as well as addressing the similar ground of reporting to other professions.

**6.0 Research Design and Methodology**

This research tries to implement various international practices and theoretical framework to be tested, improved and assimilated with Malaysian plant and machinery valuation practices, with participation from various individuals from the related fields and suggestion from various organisations for the proposed guidelines. The framework for this research is as follows:

Figure 1.1: Research framework



### 7.0 Research Method for Data Collection

This research employs a combination of qualitative and quantitative approaches to answer the research problems. An appropriate method is needed to answer all the research objectives. Therefore, the methods applied in this research are as follows:

### 7.1 Gap Identification through Literature Review

The first stage of this research is an extensive literature review on the plant and machinery valuation area. The extensive review is conducted to achieve objectives 1 of the research. The sources are books, journals, conference proceedings paper, theses, governments' regulations and standards, newspaper articles and magazine articles. The purpose of literature review in this research is to identify the research frameworks and key parameters including:

- Definition of Plant and Machinery
- The Financial Reporting of Real Estate Performances according to the International Accounting Standards (IFRS)
- International Best Practices for Plant & Machinery Valuation
  - Regulatory Framework
    - International Valuation Standard (IVS)
    - International Accounting Standards (IFRS)
    - Uniform Standard of Professional Standard Practices (USPAP) – USA
    - RICS Red Book – UK
    - Australia and New Zealand Valuation and Property Standard
    - Malaysian Valuation Standard
  - Value concept in Plant and Machinery valuation from different perspective
  - Plant and machinery Valuation Approaches – Market Comparison, Cost and Income approaches.
  - Valuation Process – Macro and micro identification, inspection.
  - Valuation Standards of Reporting for Plant and Machinery Valuation.

### 7.2 Questionnaire Survey

This research employed a questionnaire survey in order to gather qualitative and quantitative data to achieve objective 2. Attributes from objectives 1 were used as a basis to develop the question structure of the questionnaire. This primary data determined the level of understanding, awareness and application of plant and machinery valuation methodology and valuation process in Malaysia.

For the purpose of this research, the researcher has selected 10 respondents for the pilot study. These 10 respondents were selected from the government agencies and the private valuation firms. The respondents were 5 registered valuers and 5 probationary valuers, currently registered with the Board of Values, Appraisers and Estate Agents, Malaysia. The reason for the researcher to select these 10 respondents was because they were involved with the plant and machinery valuation, had previous Malaysian experiences with plant and machinery valuations and the practices or courses they have attended to master the plant and machinery valuation.

The questionnaire was divided into close ended questions and the open ended questions. The purpose of the questions was to obtain the subjective assessment (perception) of the respondents regarding the level of understanding, acceptance and suggestions of the following plant and machinery areas as gathered through the literature review as stated above. The findings from the questionnaire were used as base structure to (a) Study the level of understanding, awareness and applications of plant and machinery valuation methodology and valuation process; and (b) develop the Malaysian plant and machinery valuation guidelines in the future.

The feedback and comments from the preliminary survey were analysed to strengthen the main questionnaire. The main survey for this research was based on the questionnaire improved from the pilot study conducted earlier. It consisted of two parts, namely Part A: Respondent Background, and Part B: Plant and Machinery Valuation Understanding and Awareness

### 8.3 Research Data

In order to achieve the objectives of the research, an extensive literature review was conducted using content analysis procedures. The source of the literature review comes from different type of sources, such as books, journals, monographs, conference paper, unpublished reports and presentations, newspaper articles and others. As for the survey respondents, the proposed data were described as follows:

Table 1.8: Dissemination of questionnaire respondent

Type of Questionnaire Survey	Registered Valuer/ Valuer*	Probationary Valuer / Designated Assistant**	Total
Preliminary	5	5	10
Main	75	93	168***
<b>Total Numbers (Population)</b>	<b>700</b>	<b>840</b>	<b>1540</b>

- Note:
- \* - Registered Valuer/ Valuer was defined by Malaysian Valuation Standards as “a person who is registered as a registered valuer or a registered appraiser with the Board of Valuers, Appraisers and Estate Agents, Malaysia”. The respondent will be selected from various institutions, namely government sector, private sector, securities commission and banking/financial institution.
  - \*\* - Probationary Valuer/Designated assistant was defined by Malaysian Valuation Standards as “a person who is employed on a full time basis by a firm registered with the Board to carry out valuations and who is under the supervision of a Valuer. The Designated Assistant must be a person who has been carrying out relevant property inspections for not less than six months. The target respondent will be from various institutions such as government sector, private sector, securities commission and banking/financial institution.
  - \*\*\* - The 168 sample is based on the formula by Yamene (1967):

$$n = \frac{N}{1+N(e)^2} = \frac{290}{1+290(0.05)^2} = 168.1 = 168 \text{ company/organisations}$$

Member of these groups were selected randomly and there were 168 respondents for the questionnaires survey.

The respondents for the main survey were the registered valuer/valuer and probationary valuer/designated assistant registered with the Board of Valuers, Appraisers and Estate Agents Malaysia (BOVAEA). The reason for the choosing of these valuers and probationary valuers is that they form the back-bone of the valuation profession in Malaysia. They were the person involved in the plant and machinery valuation exercise starting from day instruction to value the plant and machinery received by the company to the production of final plant and machinery valuation report.

Simple random sampling has been used to determine the size of survey sample. As at April 2011, there were 290 companies registered to conduct valuation, property management and estate agencies businesses with BOVAEA. Overall, the numbers of registered valuers and probationary valuers is 1,540. The formula adopted for the 168 samples is based on the sample size with 95 per cent confidence level and P = 0.05 as stated above. The data collection was conducted using online survey mechanism called Kwiksurveys.com ([www.kwiksurveys.com](http://www.kwiksurveys.com)). The link that was used for the respondents to answer the online questionnaire was [https://www.kwiksurveys.com?s=ONOOMF\\_cad6a849](https://www.kwiksurveys.com?s=ONOOMF_cad6a849).

#### 7.4 Data Analysis

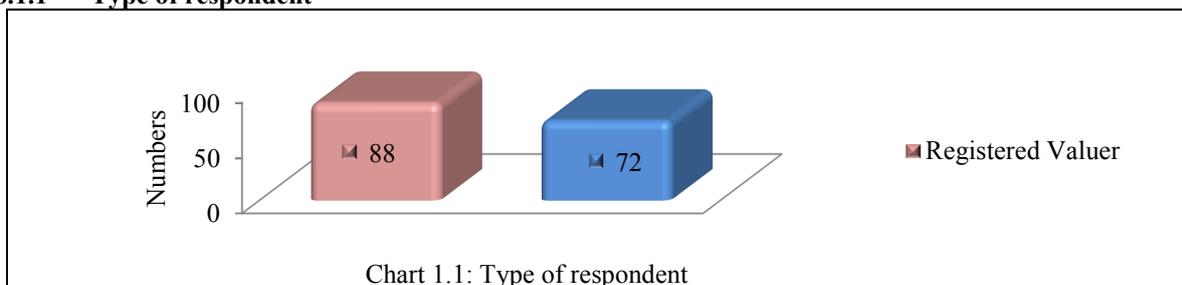
This research employed a combination of qualitative and quantitative methodology to analyse the data. Both methodologies were applied either in parallel or sequential. However, both procedures are not combined in regards that qualitative data will be analysed qualitatively and quantitative data will be analysed quantitatively (Saunders et al, 2009). The technique of analysis employed in this study is Microsoft Excel 2010. The descriptive analysis was conducted in regards to mode analysis to study the trend of respondents among the Malaysian valuers on various questions. Likert scaling was used to justify the respondent’s opinions and selections. The analysis was presented in the forms of tables, pie charts and bar charts.

#### 8.0 Research Analysis

This research analysis consists of two parts, which is Part A: Respondent Background, and Part B: Plant and Machinery Valuation Understanding and Awareness.

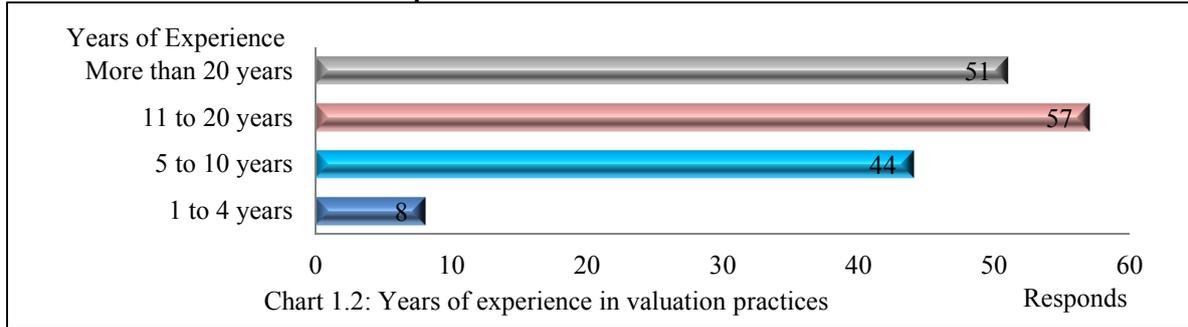
#### 8.1 Part A: Respondent Background

##### 8.1.1 Type of respondent



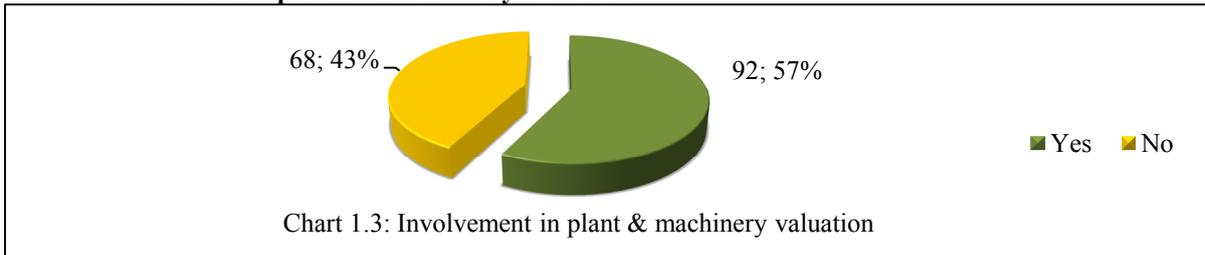
Source: Author (2013)

**8.1.2 Years involved in valuation practices**



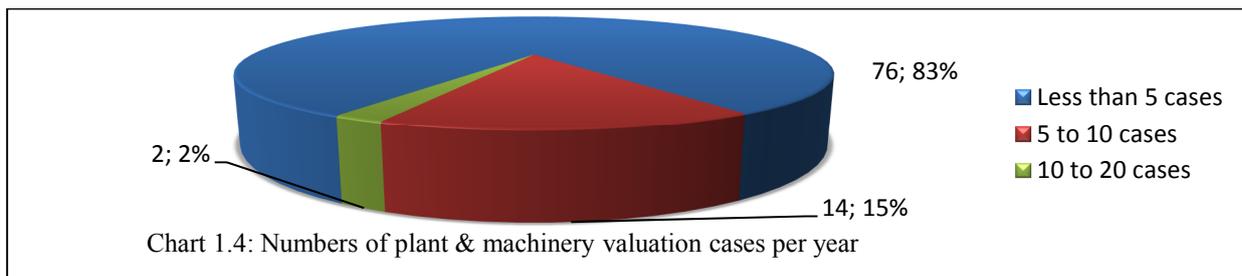
Source: Author (2013)

**8.1.3 Involvement in plant and machinery valuation**



Source: Author (2013)

**8.1.4 Numbers of plant and machinery valuation cases per year**



Source: Author (2013)

**8.1.5 Sources of references for plant and machinery valuation in Malaysia**

Table 1.9: The sources of references for P&M valuation in Malaysia.

Source	Ranking	Responds (Respondents can choose more than 1 option)
Malaysian Valuation Standards	1	92
International Valuation Standards	2	88
Asset Valuation Guidelines by Securities Commission, Malaysia	3	60
International Accounting Standards	4	9
Technical notes (P&M Courses)	5	5
Public Works Department Notes	6	4

Source: Author (2013)

**8.1.6 Factors limiting plant and machinery valuation practices in Malaysia**

Table 2.0: Factors limiting plant and machinery valuation practices in Malaysia

Nos	Factors
1	Difficulties in obtaining comparison information from Malaysian supplier/manufacturer with regards to brand, age, location of plant and machinery.

2	Lack of specification information on plant and machinery being valued (mostly for liquidation or foreclosure proceedings).
3	No database on plant and machinery current and previous costing/ acquisition price.
4	No actual plant and machinery database on sales transactions.
5	Difficulties in determining the functionality of plant & machinery during inspection.
6	Unavailability of plant and machinery in the market.
7	Difficulties in determining technologies appreciation in the country or region and the existing condition.
8	Difficulties to differentiate between substitute modern machines compared to replica machine.
9	No identical time factor can be used for plant and machinery valuation.
10	Lack of information of plant and machinery economic and effective life.

Source: Author (2013)

### 8.1.7 Forms of information to educate Malaysian valuers regarding plant and machinery valuation methodology

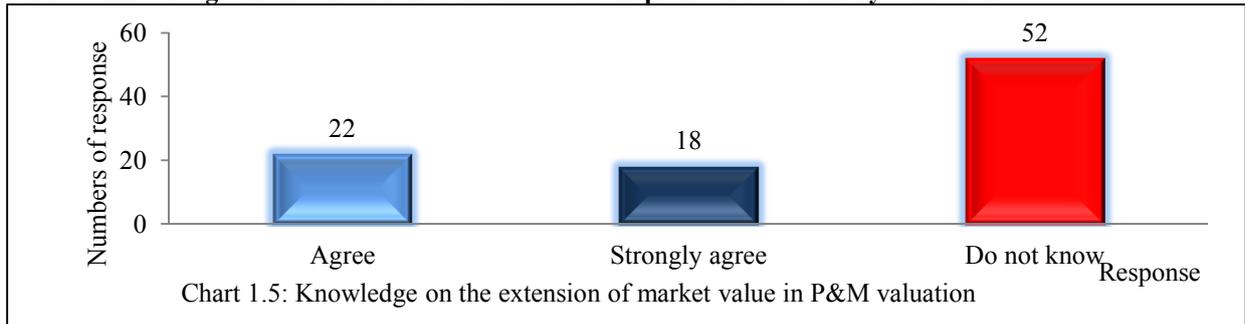
Table 2.1: Forms of information to educate Malaysian valuers regarding P&M valuation methodology.

Form	Ranking	Response (Respondents can choose more than 1 option)
Practical or guidance notes by The Board of Valuers, Appraisers and Estate Agents Malaysia (BOVAEA)	1	154
Manual of plant and machinery valuation by itself.	2	141
Introducing plant and machinery transaction and information database.	3	132
Inclusion of plant and machinery valuation syllabus in higher education learning/ universities in Malaysia.	4	120
Relevant government department to introduce compulsory plant and machinery transactions declaration.	5	15
Attachment of valuers to some firms that specialised in valuing plant and machinery valuation worldwide.	6	6
Seminar, forums, Continuous Professional Developments (CPD)	7	5

Source: Author (2013)

## 8.2 Part B: Plant and Machinery Valuation Understanding and Awareness

### 8.2.1 Knowledge on the extension of market value in plant and machinery valuation



Source: Author (2013)

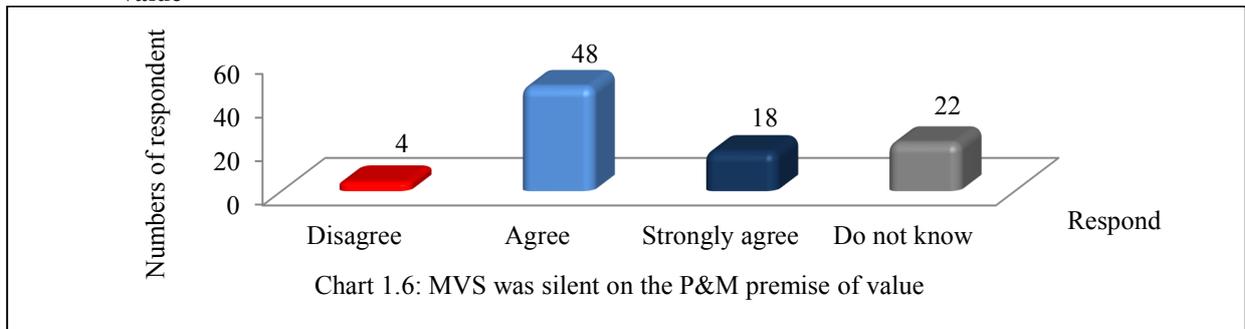
### 8.2.2 Understanding the interpretation of plant and machinery premise of value

Table 2.2: Understanding of interpretation of P&M premise of value

Premise of Value	Numbers of Respondent		
	Know	Do Not Know	Not Sure
a. Market Value In-Situ	85	7	0
b. Market Value Ex-Situ	70	18	4
c. Market Value-Removal	62	15	15
d. Reproduction Cost New	81	7	4
e. Replacement Cost New	84	4	4
f. Fair Market Value In Continued Use	62	7	23
g. Fair Market Value – Installed	66	7	19
h. Fair Market Value – Removal	53	16	23
i. Liquidation Value in Place	29	29	34
j. Orderly Liquidation Value	19	39	34
k. Forced Liquidation Value	24	34	34

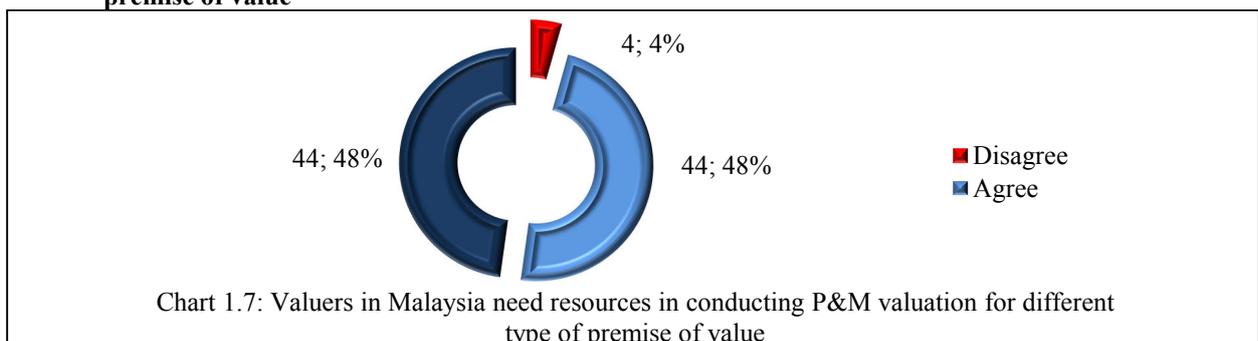
Source: Author (2013)

### 8.2.3 Malaysian Valuation Standards (MVS) has not covered the plant and machinery premise of value



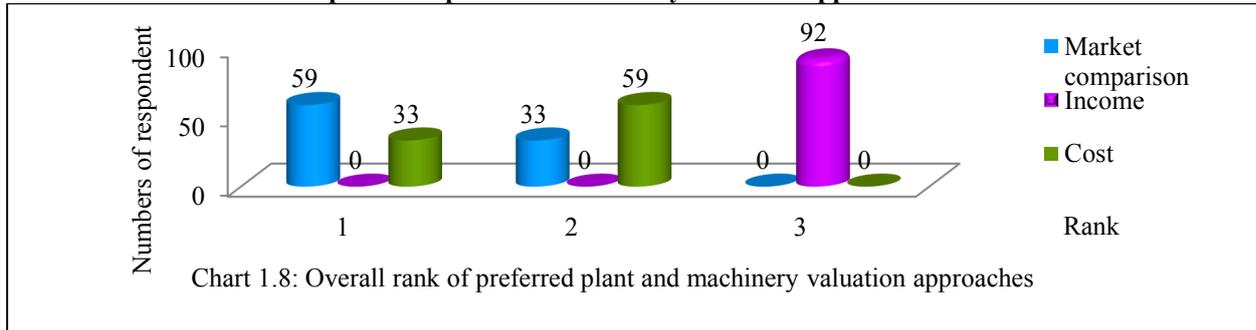
Source: Author (2013)

### 8.2.4 Valuers in Malaysia need resources in conducting plant and machinery for different type of premise of value



Source: Author (2013)

### 8.2.5 Overall rank of the preferred plant and machinery valuation approaches



Source: Author (2013)

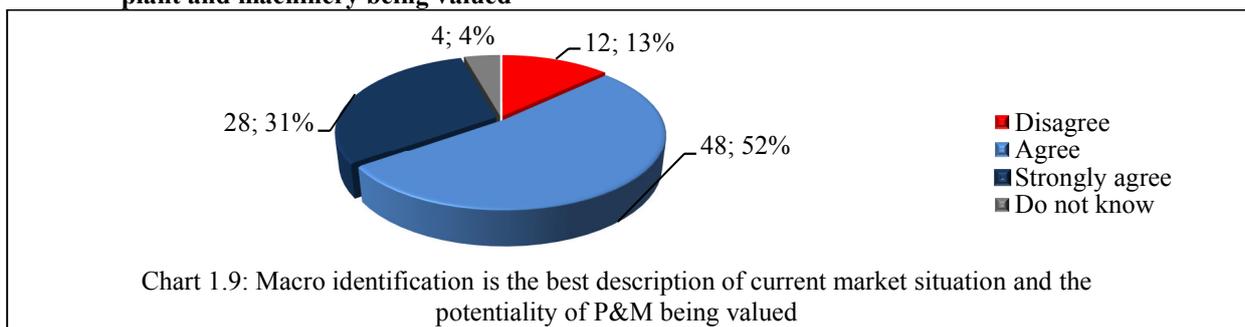
### 8.2.6 Respondent's opinion on suitability of valuation approaches on different type of premise of value

Table 2.3: Respondent's opinion on suitability of valuation approaches on different type of premise of value

Premise of Value	Valuation Approaches/Responds			
	Market Comparison	Income	Cost	Unsure
a. Market Value In-Situ	75	0	12	5
b. Market Value Ex-Situ	59	0	25	8
c. Market Value-Removal	38	0	41	13
d. Reproduction Cost New	20	0	64	8
e. Replacement Cost New	21	0	67	4
f. Fair Market Value In Continued Use	48	12	16	16
g. Fair market Value – Installed	44	4	20	24
h. Fair Market value – Removal	33	0	26	33
i. Liquidation Value in Place	21	17	8	46
j. Orderly Liquidation Value	18	13	13	48
k. Forced Liquidation Value	21	17	8	46

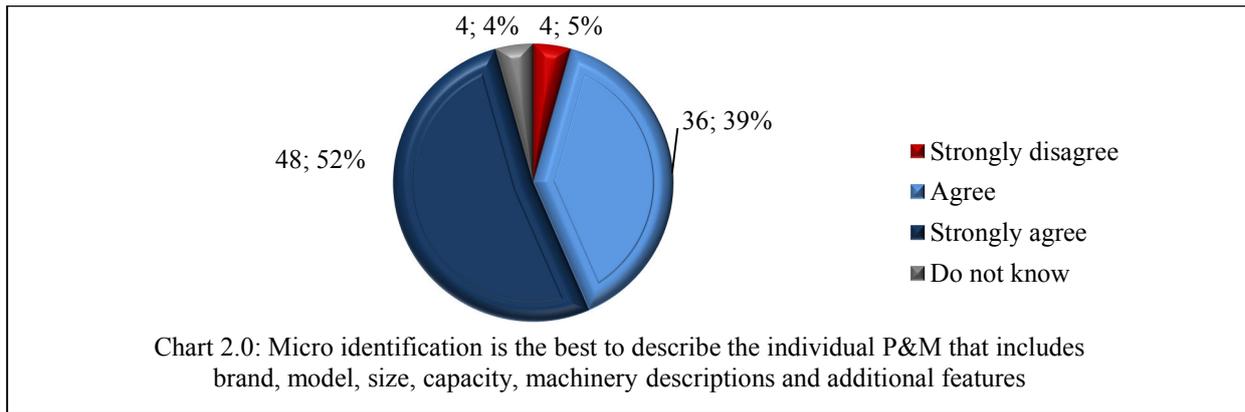
Source: Author (2013)

### 8.2.7 Macro identification is the best description of current market situation and the potentiality of plant and machinery being valued



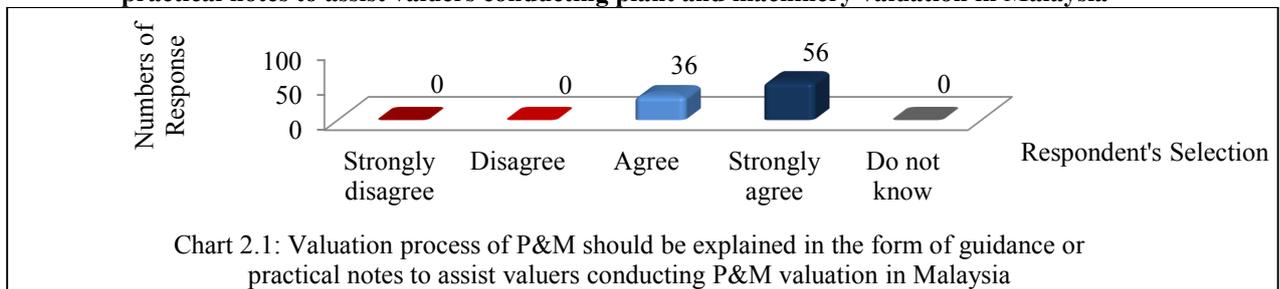
Source: Author (2013)

### 8.2.8 Micro identification of plant and machinery best describe the individual plant and machinery that includes brand, model, size, capacity, machinery descriptions and additional features



Source: Author (2013)

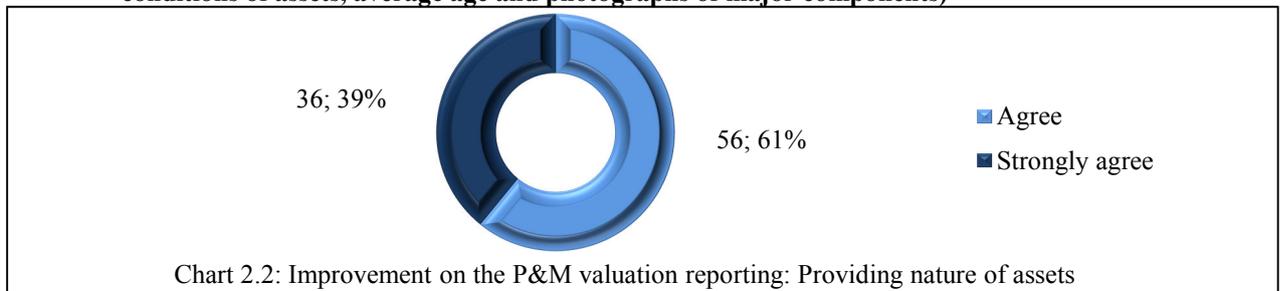
**8.2.9 Valuation process of plant and machinery should be explained in the form of guidance or practical notes to assist valuers conducting plant and machinery valuation in Malaysia**



Source: Author (2013)

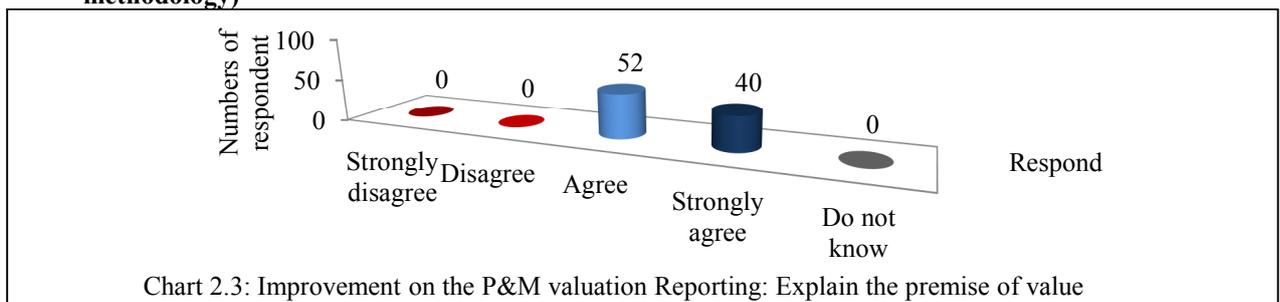
**8.2.10 Some improvement and modification should be made on the valuation reporting of plant and machinery**

**a) Nature of assets (description of the purpose of machines, production capacity, age and conditions of assets, average age and photographs of major components)**



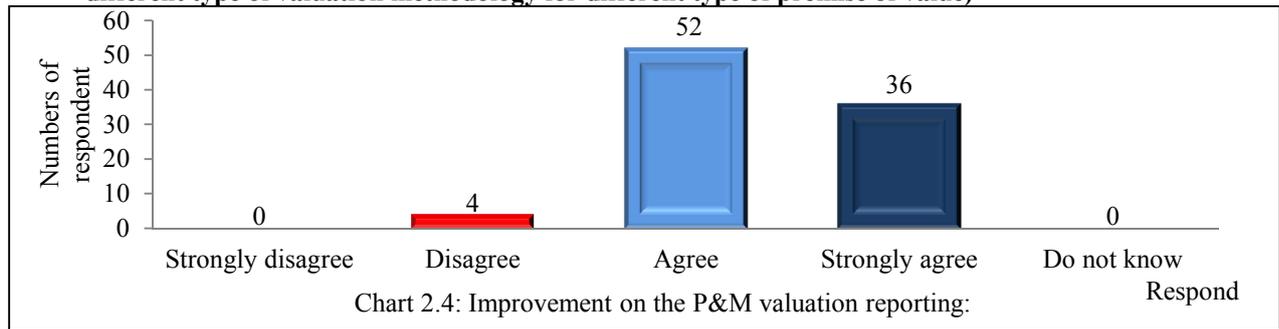
Source: Author (2013)

**b) Premise of value (explain clearly on the basis of valuation being employed, whether it is market value in-situ or market value ex-situ since different premise of value require different valuation methodology)**



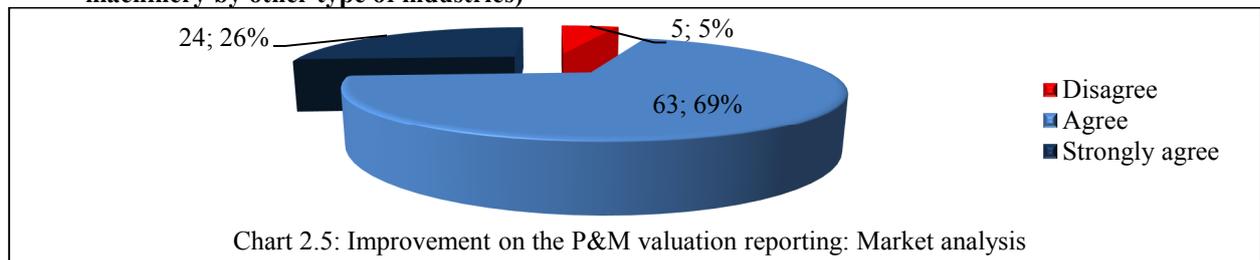
Source: Author (2013)

**c) Valuation methodology (detailing on the valuation methodology since each valuation approach has different type of valuation methodology for different type of premise of value)**



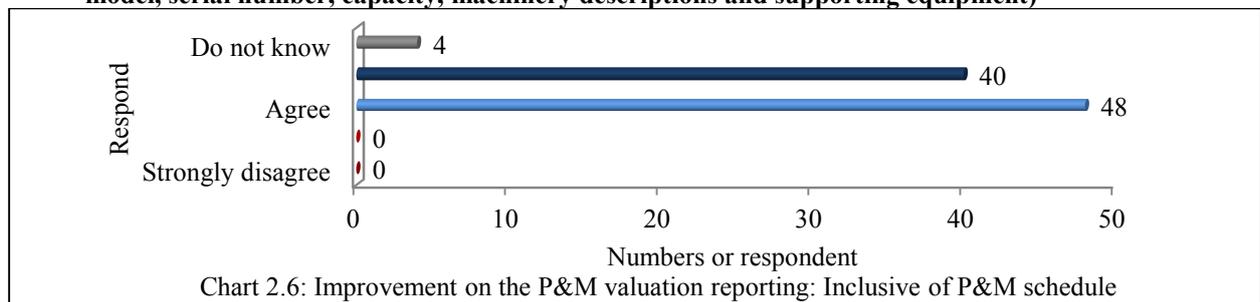
Source: Author (2013)

**d) Market analysis (descriptive studies or explanation on specific industries including second hand market, average life span of plant and machinery, changes in technology or the use of same machinery by other type of industries)**



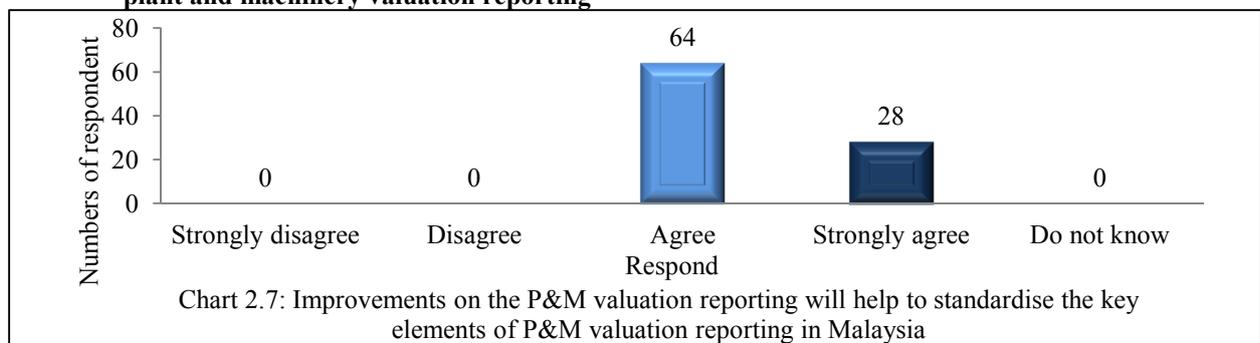
Source: Author (2013)

**e) Plant and machinery schedule (detailing of each machinery involved in the valuation such as brand, model, serial number, capacity, machinery descriptions and supporting equipment)**



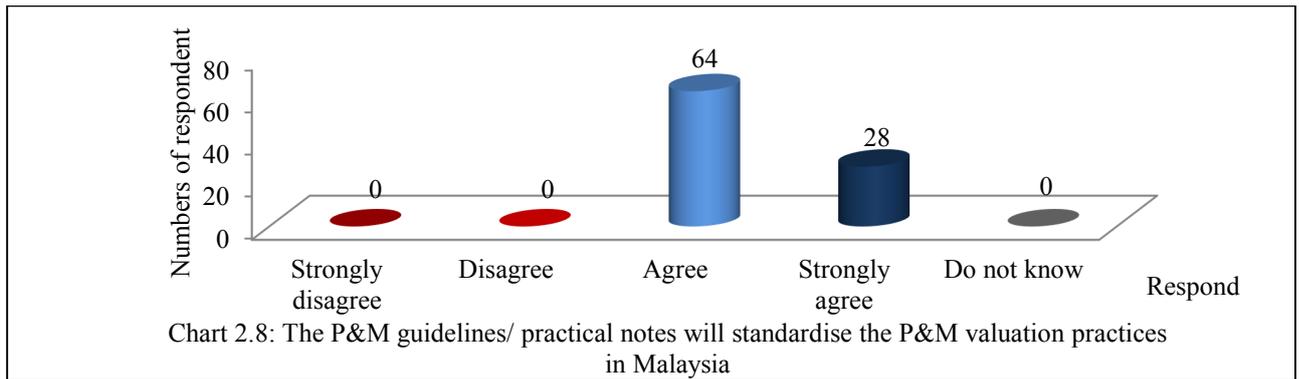
Source: Author (2013)

**8.2.11 Improvements on plant and machinery reporting will help to standardise the key elements of plant and machinery valuation reporting**



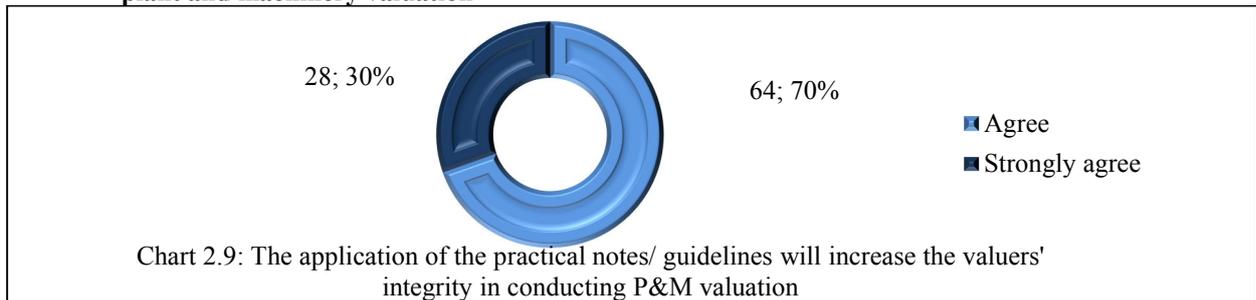
Source: Author (2013)

**8.2.12 The plant and machinery guidance notes/ practical standards will standardise the plant and machinery valuation practices in Malaysia**



Source: Author (2013)

### 8.2.13 The application of practical notes/ guidelines will increase the valuers integrity in conducting plant and machinery valuation



Source: Author (2013)

Based from the above charts from Part A and Part B, it has been proved that the level of understanding and awareness in regards to plant and machinery valuation are high. However, the lacks of information related to this type of valuation increased the necessity for the practical guidelines to be developed by regulated bodies such as The Board of Valuers, Appraisers and Estate Agents Malaysia (BOVAEA) and Royal Institute of Surveyors Malaysia (RISM). This will assist the valuers in conducting their plant and machinery valuation exercise.

## 9.0 Conclusion

The main objective of this research was to study the level of understanding and awareness of Malaysian valuers regarding the current plant and machinery valuation in Malaysia. This is important to determine how plant and machinery is being currently treated during the whole valuation exercise.

Based on the respondent's background analysis, one significant finding is that most respondents conducting plant and machinery valuations were experienced registered or probationary valuers. They have practices various type of plant and machinery valuation cases in Malaysia. Even though these valuers were experienced, the lack of guidelines or practical notes of plant and machinery valuation have resulted in various kinds of plant and machinery valuation reports. This difference is significantly connected with other findings such as lack of plant and machinery information in the market and that most valuers were trained through on the job experience.

Another prominent finding is that there were limited resources for plant and machinery valuation practices in Malaysia. Unlike other types of asset valuation such as land and building valuation with sales transactions and ownership database, plant and machinery is lacking in terms of evidence, sales transactions and references resources. To compound the scenario, even the Malaysian Valuation Standards (MVS) provides limited knowledge on plant and machinery valuation application. Information on the plant and machinery premise of value and valuation approaches were not available widely. Practitioners have to rely on foreign sources such as International Valuation Standards, RICS's Red Book, USA USPAP and others.

It is also found that there are needs of some important additions to the plant and machinery valuation report. These additions should include the nature of assets, the explanation on the premise of value being used, detailing in valuation methodologies, current market analysis and plant and machinery itemised detail in plant and machinery schedule. These additions will provide better understanding of plant and machinery valuations to the clients and the valuation users such as accountants, bankers, investors and other interested parties.

However, the main finding of this chapter is that there is a need for practical guidance notes and standards of plant and machinery valuation to be developed. These practical guidance notes and standards should include all the key elements for plant and machinery valuation in terms of the premises of value, valuation approaches and methodologies and the standard of reporting. The note or guideline is not to govern the profession, but to educate and provide common knowledge among the valuers conducting plant and machinery valuation. The development of plant and machinery guidance notes and standards is highly needed in Malaysia.

The introduction of plant and machinery valuation practical notes/guidelines will increase the level of valuation accuracy and minimise potential valuation discrepancies. It will also provide guidance to the valuers practicing plant and machinery in Malaysia, as well as significantly increase the valuers level of integrity in the long term.

## REFERENCES/ BIBLIOGRAPHY

- Abdul Rahman, Mohd Nasir (2010). Plant and Machinery: Method of Valuation. [Lecture]. Valuation of Plant and Machinery Module, International Course for Special Properties Valuation of Malaysian Technical Cooperation Programme (MTCP) 2010. National Institute of Valuation (INSPEN), Malaysia. 19 April 2010.
- American Society of Appraisers, American Institute of Certified Public Accountants, Canadian Institute of Chartered Business Valuators, National Association of Certified Valuation Analysts & The Institute of Business Appraisers (2001). *The International Glossary of Business Valuation Terms 2001*. USA: Business Valuation Resources, LLC. Retrieved on 28 February 2011 from <http://www.bvresources.com/FreeDownloads/IntGlossaryBVTerms2001.pdf>.
- Australian Property Institute & Property Institute of New Zealand (2009). *Australian and New Zealand Valuation and Property Standards*. Deakin: API & PINZ. Retrieved from [http://propertystandards.propertyinstitute-wa.com/documents/ProfPracticeV6\\_000.pdf](http://propertystandards.propertyinstitute-wa.com/documents/ProfPracticeV6_000.pdf)
- Budhbhatti, K.P (1999). *Valuation of Plant and Machinery (Theory and Practice)*. Mumbai: Budhbhatti & Associates.
- Christensen, H. And Nikolaev, V. (2009). *Who Uses Fair Value Accounting for Non-Financial Assets after IFRS adoption?* University of Chicago Booth School of Business Working Paper No 09-12. Retrieved on 18 September 2010 from <http://ssrn.com/abstract=1269515>.
- French, N. (2003). Practice Briefing-The RICS valuation and appraisal standards. *Journal of Property Investment and Finance*. Vol 21, No 6, Year 2003, 495-501. Retrieved from <http://www.emeraldinsight.com/journals.htm?articleid=1477691&show=html>.
- Herrman, D., Saudagaran, S.M. and Thomas, W.B. (2006). The Quality of Fair Value Measures for Property, Plant and Equipment. *Accounting Forum*, Vol 30 (2006), 43-59. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=312150](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=312150)
- International Accounting Standards Board (IASB) (2010). *International Accounting Standards 16 – Property, Plant and Equipment*. London: IASB. Retrieved on 10 August 2010 from <http://www.iasplus.com/en/resources/resource34>.
- International Valuation Standards Council (IVSC) (2010). *Exposure Draft, Proposed New International Valuation Standards – IVS 302.1 (Valuation of Plant and Equipment)*. London: IVSC. Retrieved from <http://www.ivsc.org/sites/default/files/2012-13%20review%20%20ED%20published.pdf>.
- Korner, Evzen (2010). Plant and Equipment. In: Catty, J.P. (ed.). *Wiley Guide to Fair Value under IFRS*. 435-449. London: Wiley.
- Malaysian Institute of Accountants, The Malaysian Institute of Certified Public Accountants and Chartered Tax Institute of Malaysia (2010). *Tax Implications Related to the Implementation of FRS 116: Property, Plant and Equipment*. Discussion paper. Retrieved on 30 August 2010 from [http://www.mia.org.my/new/downloads/professional/taxation/joint/4.%20DP\\_Tax%20Implications%20on%20FRS%20116-Property,%20Plant%20and%20Equipment.pdf](http://www.mia.org.my/new/downloads/professional/taxation/joint/4.%20DP_Tax%20Implications%20on%20FRS%20116-Property,%20Plant%20and%20Equipment.pdf).

- Malaysian Accounting Standards Board (MASB, 2010). Malaysian Financial Reporting Standards 116 – Property, Plant and Equipment. Kuala Lumpur: MASB. Retrieved on 15 August 2010 from [http://www.masb.org.my/index.php?option=com\\_content&view=article&id=142%3Afrs116-pg4&catid=6%3Amasb-exclude-private&Itemid=32](http://www.masb.org.my/index.php?option=com_content&view=article&id=142%3Afrs116-pg4&catid=6%3Amasb-exclude-private&Itemid=32).
- Malaysian Accounting Standard Board (2008). *Malaysia's Convergence with IFRS in 2012*. Press release by MASB on 1 August 2008. Retrieved on 7 September 2010 from [http://www.masb.org.my/index.php?option=com\\_content&view=article&id=1239:malaysias-convergence-with-ifrs-in-2012&catid=24:press-release-2008&Itemid=37](http://www.masb.org.my/index.php?option=com_content&view=article&id=1239:malaysias-convergence-with-ifrs-in-2012&catid=24:press-release-2008&Itemid=37).
- Mansfield, John R and Royston Paul J (2006). Aspect of Valuation Practice in Central and Eastern European Economies in *Property Management*, Vol 25, No 2, Year 2007, 150-163. Retrieved on 16 August 2010 from <http://www.emeraldinsight.com/0263-7472.htm>.
- Maninggo, Mario (2010). Plant and Machinery Valuation Methodologies. In *CPD Seminar on Plant and Machinery Valuation* organised by Institute of Surveyors, Malaysia in Kuala Lumpur, April 2010.
- Mohd Khairuddin, Abdul Halim (2008). Introduction to Plant and Machinery Valuation. [Lecture]. Valuation of Plant and Machinery Module, International Course for Special Properties Valuation of Malaysian Technical Cooperation Programme (MTCP) 2008. National Institute of Valuation (INSPEN), Malaysia. 22 April 2008.
- Mohd Sabbri, Md Yudin (2006). Plant, Machinery and Equipment Valuation. [Lecture]. Introduction to Plant and Machinery Valuation Module, Introduction to Special Property Valuation, Valuation and Property Services Department (JPPH) Officers Induction Courses. National Institute of Valuation (INSPEN), Malaysia. 15 February 2006.
- Royal Institute of Chartered Surveyors (2011). RICS Red Book. Global Edition 2011. UK: RICS. Retrieved on 2 May 2011 from [http://www.rics.org/site/scripts/download\\_info.aspx?fileID=9306&categoryID=310](http://www.rics.org/site/scripts/download_info.aspx?fileID=9306&categoryID=310)
- Spies, F F and Wilhelm D B (2005). A critical analysis of US real estate appraisal methods when used for financial reporting according to the International Financial Reporting Standards (IFRS). Conference paper presented at *11<sup>th</sup> Annual Conference of the PRRES 2005*. Retrieved from [http://www.prrs.net/papers/Spies\\_A\\_Critical\\_Analysis\\_Of\\_Us\\_Real\\_Estate.Pdf](http://www.prrs.net/papers/Spies_A_Critical_Analysis_Of_Us_Real_Estate.Pdf).
- Sze, S I (2006). The role of Premise of Value in Plant and Machinery Valuation. Paper presented at *Wavo Valuation Congress*, Singapore, November 2006. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=995203](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=995203).
- The Appraisal Standards Board of The Appraisal Foundation (2010). *Uniform Standards of Professional Appraisal Practice*. United States: Appraisal foundation. Retrieved on 15 August 2010 from <http://www.uspap.org/2010USPAP/USPAP/frwr/definitions.htm>.
- The Board of Valuers, Appraisers and Estate Agents, Malaysia (BOVEA) (2006). *Malaysian Valuation Standards*. Kuala Lumpur: BOVEA.
- Yamane, T. (1967). *Statistics, an Introduction Analysis*. Second ed. New York: Harper and Row.