AN 'AMALGAMATED-MODEL' OF PERFORMANCE MEASUREMENT FOR PRIVATE FINANCE INITIATIVE PROJECT IN MALAYSIA

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ABSTRACT

In Private Finance Initiative (PFI), payment for services is based on pre-determined standards and performance. Thus, Key Performance Indicators (KPIs) have been used to measure this performance. However, in Malaysia, the absence of an effective KPIs is identified as one of the core criticisms for measuring the PFI projects performance. Therefore, two objectives are established which are; to investigate the implementation of various PFI performance measurement models across the globe and how these models can be adopted within PFI in the Malaysia's context. Finally, an 'Amalgamated-Model' of Performance Measurement approach for PFI Project in Malaysia is proposed for measuring the project performance. The outcomes of this research can serve as a theoretical base for the improving performance measurement model in monitoring and measuring PPP projects performance in Malaysia.

Keywords: *key performance indicators, performance, performance measurement tool, private finance initiative*

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INTRODUCTION

In recent years, governments worldwide have adopted Public Private Partnership (PPP) more extensively for the reason of achieving value for money (VFM). The government in the United Kingdom (UK) had originally adopted this procurement method since 1992. It involved the transformation from a traditional contract of delivery (design and construction) of providing public service projects to the privately financed (finance, design, construct, manage and operate) public facilities. This approach is called Private Finance Initiative (PFI), which is laid under an umbrella of PPP. Carrillo et al. (2006; 2008) in their research defined the PFI as the involvement of the private sector in financing, management skill, and capabilities of implementing the public sector projects (constructed facilities and services) within the stipulated concession period, typically 20–30 years (NAO, 2003; El-Haram & Agapiou, 2002).

PPP is a contractual arrangement between public and private sectors, where the private sectors need to deliver good services and successful performances within stipulated concession period. While, the public sector is accountable for monitoring and measuring the performance of the private sector in delivering good services and facilities. Simultaneously, PPP also emphasizes the concept of VFM and innovation based on harmonious partnership (Yuan et al., 2008). According to Robinson and Scott (2009), VFM in a PPP project crucially depends on the performance of the projects.

Fundamentally, the PFI projects are designed to fund long-term public infrastructures and services provided for the whole life cycle of PFI projects. During this period, PFI performances could be affected by many factors, which might cause the inefficiency and ineffectiveness of the projects. For instance; defects occurrence (Isa et al., 2016; Universiti Teknologi MARA, 2016); complaints from users on poor facilities and services provided; low level of users' satisfaction (Universiti Teknologi MARA, 2015; 2016); and conflict between payment and measuring performance (Oyedele, 2013; Yescombe, 2008). These factors would contribute to the low level of PFI performance and consequently will impact on payment to the concessionaire. As such, payment deduction will be imposed to the poor or low level of performance standard achieved by the concessionaire (Oyedele, 2013). It is supported by the report from NAO (2010), that service

failure and poor performance in maintenance work for non-compliance with output specification are frequently reported within PFI projects in the UK and Australia. This result will affect the success of a PFI project implementation and consequently failed to achieve VFM. Factors that will influence the level of performance should be measured before any deductions is imposed. Therefore, to measure the level of PFI projects performances, the establishment and selection of an effective performance measurement tools is a necessity.

In PFI projects implementation, Key Performance Indicators (KPIs) is used as a measuring tool in determining the level of performance and overall success of the PFI projects. However, in Malaysia, the absence of an effective performance measurement tools is identified as one of the core criticisms towards the implementation of measuring PFI projects performance (Ismail, 2012; Khaderi & Aziz, 2010). It also happens to the other countries while measuring the performance of the PFI projects. Many researchers have proved that the absence of an effective performance measurement in PFI will reflected the service quality of infrastructures. Consequently, it will contribute to the failure deliveries of PFI projects (Yuan et al., 2009; Liu et al. 2013; Regan et al. 2011; Hodge, 2004; Yong, 2010; VAGO, 2002; House of Commons, 2003; Mladenovic, 2013). Therefore, an establishment of KPIs as a performance measurement tool is vital to make PFI projects functioned effectively and efficiently.

Even though a lot of studies on KPIs have been conducted with the aim to improve the performances, nonetheless, KPIs are still continuously debated. For instance; lack of clarity and understanding of KPIs for PFI projects (Lawther& Martin, 2014; Javed et al., 2013a; David & Steve, 2012) and insufficient effective performance indicators for measuring quality of the service delivery (Toor & Ogunlana, 2010; Oyedele, 2013; Javed et al., 2013b). The agreeing level of performance is what determines the payments or deductions from the public sector to the private sector. Consequently, if the quality of service does not achieve the minimum standards stipulated in the output specification, a payment deduction or penalties can be triggered in the form of a performance failure payment deduction (Yescombe, 2008). Therefore, the development of an effective performance measurement is crucial in determining the level of service quality and facilities delivered by the concessionaire, so that it can be monitored and measured effectively and

efficiently. Figure 1 shows the relationship between the issue of performance, measuring performance and impact of issues on the implementation of the performance assessment for the PFI project in Malaysia.

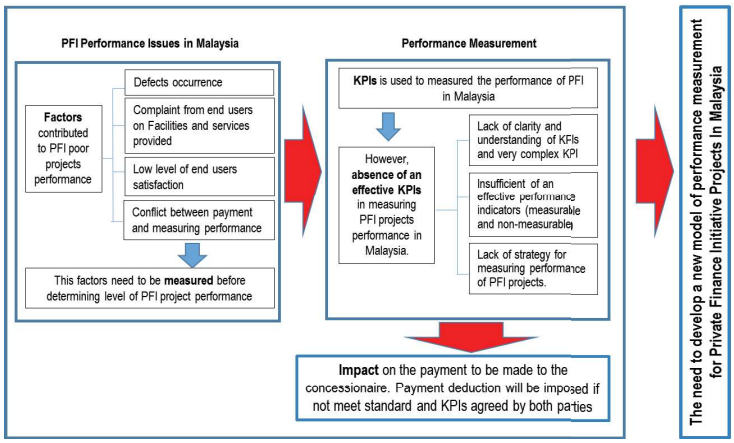

Figure 1: Relationship between Performances, Performance Measurement and Impact of issues to the PFI Implementation in Malaysia

This study presents an early research purely based on literature review and preliminary survey on the understanding of performance measurement in PFI projects. It takes into account the soft and hard issues of PFI projects performance, concept and various types of performance measurement tools, which can be adapted for PFI projects in Malaysia. Within this context, this research presents two objectives, which are; to investigate the implementation of various PFI performance measurement models across the globe and how these models can be adapted to the context of PFI in Malaysia. Finally, an 'Amalgamated-Model' of Performance Measurement approach for PFI Project in Malaysia is proposed for the purpose of measuring the project performance. This model comprises of criteria and performance indicators (measurable and non-measurable).

LITERATURE REVIEW

Overview of PFI Globally

PFI was initiated in 1992 under United Kingdom (U.K.) government and has transformed its approach from traditional delivery of providing a range of public service projects, such as hospitals, schools, prisons, roads, etc., to privately finance, design, construct, manage, and operate these facilities. PFI is a unique procurement approach nominated by the governments all over the world. It is unique regarding the nature of the projects and smart partnership adopted in the contract, even though they involved a lengthy concession period throughout the whole life cycle. As such, Kamara (2012) defined PFI as a form of public private partnership, where a single organisation (private sector) provides the financing, design, construction and operation of the facility over a 25-30 years period of concession.

In addition, PFI is a procurement method that has been successfully implemented by many countries worldwide such as United Kingdom, Australia, USA, China, Hong Kong, France, Germany, Japan as well as Malaysia. The main guiding principle is the usage of the private sector in the provision of constructed facilities by using a whole life approach (delivering and maintaining it) within the whole life of concession period. The method includes the operational and maintenance phases of the projects throughout the entire concession period. (El-Haram & Agapiou, 2002; NAO, 2003).

PFI in Malaysia

Private sectors' participation in providing facilities and public services is not a new thing in Malaysia where it has been implemented since the 1980s. The adverse impact of the world economic recession prompted the government to seek assistance from the private sector for the development and economic activities of the country (Ismail & Rashid, 2007). Currently, most of the public projects have been plagued by delays and shoddy workmanship, which are inherently seen as a major problem to the government (Jayaseelan & Tan, 2006; Endut, 2008). As a result, the maintenance repair costs are increased, causing the Malaysian Government to be reluctant to spend huge amounts of money on the development of

public infrastructure projects as public sector capital fund is insufficient (Netto, 2006). Therefore, to bridge these issues, the Malaysian Government is turning to alternative ways such as PFI for transforming the public projects. PFI evolution in Malaysia started from the 4th Malaysian Plan with the agenda of privatisation incorporation. The evolvement of privatisation continued to the 6th Malaysian Plan with the introduction of Privatisation Master Plan. Then, the concept of PPP is introduced in the 8th Malaysian Plan and the ownership structure named PPP is re-branded as PFI in the 9th Malaysian Plan. Following these plans, the 10th Malaysian Plan continued to incorporate PFI in developing Malaysia. This agenda is sustained in the 11th Malaysian Plan so as to promote the involvement of the private sectors in investing in the Malaysian development. The rationale of utilising the PFI procurement in Malaysia is to provide better and more efficient public services by sharing resources between public and the private sectors (Takim et al., 2008).

Referring to that, PFI in Malaysia is originally initiated by the Malaysian Government through the Ninth Malaysia-Plan (2006-2010) under the National Privatization Plan (Economic Planning Unit, 2006) and is officially implemented in 2009. The Malaysian version of PFI will be financed by the EPF loans in which the amount is published in the Ninth Malaysian Plan. To facilitate the implementation of PFIs, the Ministry of Finance Malaysia has acquired a substantial amount of funds to facilitate the first wave of PFI implementation in Malaysia (Jayaseelan & Tan, 2006). In Ninth Malaysian Plan, RM20 billions are allocated for these PFI projects. Nevertheless, there is a view that the government could still bear the risk to a certain extent, in particular if any of the PFI projects becomes unsuccessful.

PFI procurement scheme in Malaysia is still at an infant stage, and the concept of PFI is lagging behind compared to other experienced countries such as UK and Australia. One of the issues experienced by the Malaysian government is in the assessment of PFI projects performance. The absence of performance measurement tool to measure the project performance is identified as a factor that leads to the poor project performance in Malaysia (Ismail, 2012; Khaderi & Aziz, 2010). Therefore, the establishment of a framework is paramount to provide a better understanding of the execution of the complex scheme of financing, as well as the establishment of the KPIs for assessing overall projects' performances is a necessity. Despite

the tremendous growth of PFI implementation in Malaysia, the PFI arrangements have constantly been reviewed and revised by the Malaysian government to improve the present practice of PFI implementation to ensure the achievement of its ultimate goal and objectives.

Currently, there are 28 projects listed under Unit KerjasamaAwamSwasta (UKAS) and 75% of the projects are for social infrastructure, which is on the educational sector and 29% is from economics infrastructures such as bridge and highway. Most of the PFI projects in Malaysia are currently operated under operational and maintenance (O&M) phase. However, poor performance (defects occurrence) and low level of end users' satisfaction (complaints) in PFI projects in Malaysia are disappointing. In a real situation, the government has paid a full amount of payment (availability payment) to the concessionaire, but indeed they have not met the level of performance standard set by the government. This situation occurs because of the absence of effective performance measurement tool to measure the performance of PFI projects especially after entering O&M phase. This situation will affect the payment process to the concessionaire where payment deduction will be imposed if the concessionairenot meet the performance standard set by the government (Universiti Teknologi MARA, 2015; 2016; Isa et al., 2016). Therefore, performance needs to be monitored and measured (the relationship between performance and payment) to achieve VFM.

Performance Measurement System in PFI Projects

The key principle of PFI is the link between performance and incentive payments to the private sector based on successful delivery of services to the public sector. However, the service delivery aspects of PFI projects cannot be examined until the projects become operational (Yuan et al., 2009). During the operational phase, services delivery can be frequently measured to determine its compliance with the output specification and payment deductions for the performance failures in agreement with the payment mechanism (Akbiyikli, 2013).

In construction industry, there are five types of performance measurement models used to measure projects performancenamely; the Balance Scorecard (BSC) by Kaplan and Norton (1992), the European Foundation Quality Management (EFQM)by EFQM (2003), the

Performance PRISM by Neely and Adam (2001), the Key Performance Indicators (KPIs) by Eagan (1998) and the Malcolm Baldridge for Performance Excellence (MBNQA) by Alsulamy et al., 2012. Nonetheless, for the specific PFI projects, KPIs is commonly used as useful tool to measure the performance at different levels and stages of the project. The U.K NAO (2003) acknowledged that most PFI contracts use KPIs as a benchmarking tool for contractors' evaluation with regards to service delivery. To measure performance or calculate the effects of any given change in the process of PFI projects, one must determine the appropriate KPIs to focus on and measure the impact (Yuan et al., 2009). The used of KPIs in PFI projects can be used to identify the strengths and weaknesses of PFI projects and are useful tools for effective PFI project performance management (Mladenovic et al., 2013).

Performance measurement is an important process concerning to the success and performance of PFI projects. However, it has received limited attention from the life-cycle perspective (Liu et al. 2015). Neely (2005), defines performance assessment as a process or a set of metrics used to quantify and report the effectiveness and efficiency of the action performed towards organisations' objectives. While, Ong'olo (2006) in his study describes that, performance measurement refers to the selection and the use of quantitative measures (an item that can be quantified based on the measurement units) and qualitative measures (an item that can be quantified based on satisfaction level). The assessment is regarding project capacities, processes and outcomes to inform the public or designated public agency about critical aspects of a project. Thus, the assessment of PFI projects become more difficult compared to traditional projects as it involves a lot of stages (e.g. documentation, financing, taxation, technical details, and sub-agreements) and risks (e.g. market risks and project risks) that arise from the complexity of long-term contractual arrangement, which can change dynamically over the projects' lifecycle (Grimsey & Lewis, 2002). Theoretically, an ideal performance measurement system in PFI can contribute primarily to an adequate assessment of PFI projects performance and beneficial to the multiple stakeholders.

METHODOLOGY

An in-depth and comprehensive literature review is conducted in this study. It discusses and reviews the developed performance measurement model for specific PFI projects across the globe in the United Kingdom (UK), China, Australia, and Malaysia. Based on various developed models, the proposed 'Amalgamated-Model'as a framework for Malaysian approached is established. This model is developed based on the gaps identified and uniqueness from previous practices that can be adopted for the Malaysia's context. This paper is limited to the study on the performance assessment for the specific operational and maintenance (O&M) phase of the PFI projects.

Further study is planned to be conducted by comprehensive empirical research using a combination of qualitative and quantitative research design (Creswell, 2012; Parmjit et al., 2006). This study will be conducted through case study (semi-structured interview) and questionnaires survey using Analytical Hierarchy Process (AHP) method by Saaty (2008). Saaty (2008) mentioned that AHP method involved multi-criteria decision making when it used to rank and assign weightage for each indicators. Then,the study will followed by the development and validation of performance measurement tools. Sequential mixed methods design (exploratory design) have been applied for instrument validation, when both qualitative and quantitative methods have been used for validation (Creswell, 2012).

LITERATURE FINDINGS

A Review of Performance Measurement Models Internationally

Table 1 shows the performance measurement model for PFI projects adopted by the UK, Australia, China, and Malaysia. These models are chosen in this study due to their experience and establishment ofthe implementation of PFI and good track records in terms of performances. Among all, UK is a pioneer and originator of PFI approach regarding contract procurement as well as performance assessment in the PFI projects. Six variables have been reviewed to compare the performance measurement models across the globe. The variables are; types of performance measurement tool, criteria in

selecting good performance indicators, categories of KPIs, KPIs measures, types of infrastructure projects, implementation stage, and gap/limitation of each model. Most of the model are using key performance indicators (KPIs) as a base method for assessing the performance of PFI projects except for the model from Australia, which is by using performance prism. There is no different concept between Australia models with other models where indicatorsare still applicable.

The UK performance measurement model of PFI project by Zhou et al. (2013) outlines a process starting by looking into performance measurement tools used in the PFI projects. This model is designed to use KPIs as a tool in assessing PFI projects performance. The development of KPIs by UK model depends on certain criteria, which are complex, defined, measurable, simple and understandable.The UK model has divided the KPIs into four categories of dimensions, which are social, economic, environmental and technical. These cover most of the critical sustainability issues through the wider PFI project environment. Consequently, this model failed to show the relative weight and method on how these indicators would be used to measure the performance.

In the context of Australia, the performance measurement tool applied in the model is performance prism. The performance prism by Liu et al. (2013) has a similar concept with KPIs but differs concerning the involvement of multiple stakeholder integrations and it provides assistance in directing and guiding the design of performance measurement for long-term success. The performance prism comprises of five interrelated facets designed for measurement such as stakeholder's satisfaction, strategies, processes, capabilities, and stakeholder's contribution. The views of stakeholders that are incorporated in the Performance Prism means that it gives the ability to overcome the hurdle triggered by multiple stakeholders in PFI evaluation.The development of performance prism takes into consideration both measurable and specific criteria for each dimension.

Table 1: List of PFI Performance Measurement Models Developed Internationally

Variables	*UK Performance Measurement Model (Zhou et al. 2013)*	*Australian Performance Measurement Model (Liu et al. 2015)*	*China Performance Measurement Model (Yuan et al. 2009; 2012)*	*Malaysia Performance Measurement Model (Ismail, 2009)*
Performance Measurement Tools	• Key Performance Indicators	• Performance Prism	• Key Performance Indicators	• Key Performance Indicators
Criteria for selection of performance Indicators	• Complex • Defined • Measurable • Simple & Understandable	• Measurable • Specific	• Defined • Specific • Complex • Measurable	• Presented via metric • Measurable • Closely monitor performance • Understandable • Link with reward and penalty
Categories of key performance Indicators	• Social • Economic • Environmental • Technical	• Stakeholders satisfaction • Stakeholders contribution • Strategies • Process • Capabilities	• Physical characteristic of the project • Financing and Marketing • Innovation and Learning • Stakeholders • Projects Process	• Functional • Professional • Operational
Measures	• Quantitative measure • Qualitative measure	• Objective measure • Subjective measure	• Quantitative measure • Qualitative measure	• Quantitative measure • Qualitative measure
Implementation (Project Phases)	• Operation & Maintenance	• Design • Building • Finance • Operation & maintenance	• Planning • Design • Procurement • Construction • Operation and Maintenance	• Planning • Design • Procurement • Construction • Operation and Maintenance
Gap/Limitation	• Lack of experience consultant for sustainability • Lack in depth analysis of individual projects	• No specific itemized indicators (Objective and subjective) • No detailed measures (weightage system)	• Lack of stakeholders contribution • No specific itemized indicators (qualitative and quantitative) • Complex KPIs • No detailed measures (weightage system)	• Only focused on Functional categories • No specific itemized indicators (qualitative and quantitative) • No detailed measures (weightage system)

The China performance measurement model by Yuan et al. (2009, 2012) uses KPIs as a tool in measuring the performance of PFI projects. It differs from the UK model where the KPIs are comprehensively used in assessing the sustainability of PFI projects performance. KPIs developed in China performance measurement model are basically based on the main criteria, which are identical to the UK model, which are defined, complex and measurable. KPIs must be specific, clear and focused on avoiding misinterpretation or ambiguity. This model has categorised the dimensions into five categories, which are physical characteristic, financing, and marketing, innovation and learning, stakeholders and projects process. However, the method how to measure performance using KPIs is not explicitly stated to indicate the weighting system for each indicator.

For the Malaysian context, KPIs approach is used to measure the performance of the PFI projects. A study by Ismail (2009) divides the KPIs into three categories, namely functional, professional and operational. The formation of KPIs is fundamentally based on the criteria such as presented via metric, measurable, closely monitored performance, understandable and KPIs must link with reward and penalty. All listed criteria are vital to be considered when choosing and constructing the KPIs. Even though the development of an appropriate KPIs identified in this model has been empirically tested and validated, but there are only verified for the functional category, and future recommendation is suggested to continue for the other categories (professional and operation).

Synthesis of PFI Performance Measurement Models Internationally

The parameters discussed in Table 1 above are the types of performance measurement tool, performance measures and indicators, criteria for selecting good indicators, types of infrastructure projects and project stages. The key issues of these models are to enlighten on the core components in the development of the performance measurement tool for assessing and measuring performance of PFI projects. Using the information derived from the review, critical issues are captured. There are many similarities in the used of performance measurement tools employed by the countries as listed in the above table.

From an analysis point of view, most of the countries referred to use the KPIs, which mainly focus on measuring the performance. As mentioned by Eagan (1998), KPIs was used globally in the construction and appears to be more applicable and useful to be executed primarily involving several types of contracts. Besides, all the models highlight the criteria needed for the selection of a good performance indicator. Zhou et al. (2013) reveal that complex, defined, measurable, simple and understandable are among the criteria needed for the selection of indicators for the PFI projects. It is almost similar to the model from China (Yuan et al., 2009; 2012), where the identified criteria are defined, complex, measurable and specific.Meanwhile, Liu et al. (2015) highlight measurable and specific as the main criteria needed. It differs with the Malaysia model, where every single indicator must be presented via metric, measurable, closely monitored performance, understandable and linked with reward and penalty. It can be seen that specific and quantifiable are among the important criteria to be considered. The categorisation of the KPIs amongst the models differs according to the nature of the projects but similar regarding item measures, which are emphasised on qualitative and quantitative measures. The application and implementation of the KPIs are mostly for the whole life cycle projects. There is a single model that is stressed on the specific critical phases (operational and maintenance), which are the model from United Kingdom (Zhou et al., 2013).

As discussed, the evaluation of the PFI projects performance is determined through the use of practical tools with adequate dimensions (quantitative and qualitative measures). From the review of the performance measurement models from those countries, it indicates that differences exist in the selection of indicators, application to different phases and methodology/process in assigning the weighting system in use by those countries. However, it shows the similarity in the use of criteria in selecting good indicators which most of the countries are referred to the theory developed by Locke and Lantham (1990) and the phases that performance measurement needs to be carried out. Typically, there are several phases in PPP life cycle projects (Ismail, 2012). Most of the performance measurement tools (KPIs) are implemented for the whole phase except for UK model which specific on the O&M phases. There is a need to consider more detailed on this specific O&M phase as the payment to the concessionaire and monitoring the operational performance begins at this stage (Akbiyikli

& Eaton, 2006). Although KPI is developed by recognised countries, there are some limitations and gaps identified. No specific itemised indicators (objective and subjective) and no specific measures (relative weighting system) are among the crucial aspects that need improvements. The data collected from different countries will be used as an improvement on monitoring and measuring performance (KPIs development) for other countries.

In Malaysia, the implementation of the KPIs as performance measurement tool has been subject to projects goal and objective. Even though most of the projects listed under UKAS using KPIs as a useful tool to measure and monitor the performance of the PFI projects, however, there is still lacking concerning the development of a good indicator to link with the payment mechanism. Therefore, the importance to improve on the performance measurement tool in Malaysia is vital and is yet to be established. The robust reason could be on the issue of achieving VFM, where the government has to pay the concessionaire in full amount as agreed in the agreement but the level of quality and satisfaction is at the lower level.

Proposed An 'Amalgamated-Model' of Performance Measurement for PFI Projects In Malaysia

Figure 2 shows a framework for an amalgamated-model (i.e., three components/process) in measuring PFI project performance. The development of this framework comprises of three main components, which are performance measurement, performance measurement tool, and performance standard. The first component is to measure the performance of PFI projects for the identified critical phase. To measure the performance, effective and efficient tools are required. The second component is performance measurement tool. This research focuses on the second component, which is the development of performance measurement tool. This component is divided into three sub-components namely KPIs, weighting system and criteria for good indicators.The initial step in developing a new performance measurement tool is to select the appropriate phase that should be incorporated. Next is to determine the indicators that can be used for measuring the performance of selected phase.Lastly is to determine the relative weighting system for the overall assessment of PFI projects.

Component 1: performance measurement

Fundamentally, the model starts with Step 1, which identify the critical phases in implementing KPIs as a measuring tool. Based on the preliminary survey conducted by the researcher, operational and maintenance (O&M) phase identify as the most critical phase throughout the life cycle of PFI projects when relating to the performance assessment. In this framework, performance measurement is designed to embrace the specific phases of the PFI projects, which is focused on the crucial phases throughout the project life cycle. Operational and Maintenance (O&M) phase has been seen as the critical phase since they are involved in a lengthy period of concession. Most critically, the payment to the concessionaire begins at this phase. Thus, the performance level of the PFI projects needs to be monitored and measured to achieve VFM.

Component 2: performance measurement tool

Step 1: To determine the indicators that can be used for measuring the performance of PPP project.

The following step is to determine the indicators that can be utilised for measuring the performance of PPP projects. The implementation of performance measurement via KPIs approach is necessary to achieve performance standards set by the government and simultaneously can provide good quality of services and achieve VFM. Therefore, KPIs reflect as one of the useful performance measurement tools used to assess the performance of the PFI projects, specifically in Malaysia. There are several indicators identified and further grouped into five main KPIs. These selected KPIs are aimed to measure performance at O&M phase, i.e. innovation and learning, process, strategies, stakeholders' satisfaction and stakeholders' contribution. Further, these KPIs are classified into two categories, which are measurable and non-measurable indicators. The identified indicators are relatively compiled and characterised from previous established performance measurement models from different countries such as model from UK, Australia, China and Malaysia and also precedent research (Liu et al. 2015; Zhou et al., 2013; Miguel & Lima, 2013; Ogunsanami, 2013; Yuan et al., 2009; 2012; UiTM, 2012; Ismail, 2009). The KPIs involved is focused on innovation and learning, process, strategies,

and capabilities as measurable indicators. As for non-measurable indicators, the assessment is focused on stakeholder's satisfaction and stakeholder's contribution.

Step 2: Assigning weighting and scoring system for measuring the performance of PPP project.

Next is prioritising and assigning of weighting for each indicator via Analytical Hierarchy Process (AHP) method as it is involved with a multi-criteria decision making (Saaty, 2008). Measurable indicators are measured using a performance scoring system (by using percentage). According to NAO (2005), 95% of performance level achieved is the minimum service standard at which full monthly concessionaire payment is made. The process to assign the weighting for each indicator will be done by using AHP method. Furthermore, for non-measurable indicators, the performance is measured based on the satisfaction level of the stakeholders, and the rating relies on the rating scale.

Step 3: To establish the indicators with the criteria of a good indicator.

Afterward, the prioritised KPIs will be correlated with the criteria in selecting good indicators. The criteria are gathered from the theory of goal setting, and task performance (Locke & Lantham, 1990) and some are compiled from previous studies. This relationship is important to make sure all the established indicators can be implemented effectively in measuring the performance. There are fifteen identified criteria to be correlated with each indicator which is; specific, measurable, attainable, realistic, time limit, closely monitored, understandable, consistency, linked with reward and penalty, comparability, reliable, relevance, generalized, defined and complex notion. The dimension of KPIs in Figure 2 have covered the characteristic of O&M phase that mainly concerns on the performance and its impact towards the payment mechanism.

Component 3: Achieving performance standard

The development of performance measurement tool then will determine the performance whether achieved O&M performance standard

or not. The result derived from the second component will determine the performance level and will indicate whether concessionaire meets the performance standard or not. It also demonstrates whether the project achieves its VFM or vice versa.

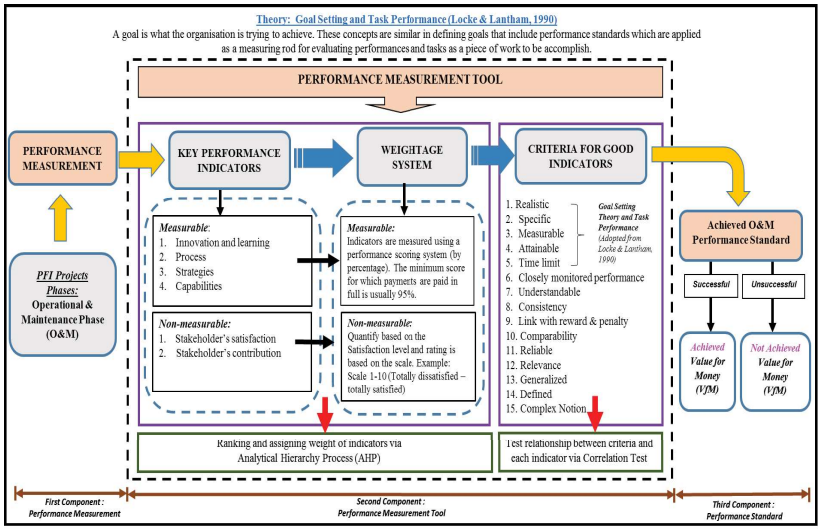

Figure 2: An Amalgamated-Model of Performance Measurement for PFI Projects in Malaysia

CONCLUSION

This paper anticipates to review, synthesise and develop a conceptual framework of performance measurement based on KPI method for PFI projects in Malaysia. The development of this conceptual framework relies mostly on the reviewed models of performance measurement from various countries i.e. UK, China, Australia, as well as Malaysia. It also intends to identify the direction and usefulness of performance measurement tools (KPIs based method) to be practiced for PFI projects in Malaysia. Most of the models are applying KPIs as a tool to assess the performance of PFI across projects' phases. However, no single model that has been developed to determine weighting system for each indicator in measuring the performance of PFI projects. As a result, gaps are identified in this

study through the listed limitations.Therefore, it is vital for the Malaysian Government to develop a performance measurement tool for assessing PFI projects' performance especially for the critical phase of operational and maintenance (O&M), which involves a lengthy concession period (25-30 years) and has a direct relationship with the payment mechanism.Even though KPIs is currently used for measuring the PFI performance, however further study on the importance and challenges of KPIs compared to the other types of performance measurement system applied in the construction industry should be carried out to enhance the applicability and effectiveness of KPIs in PFI project.

The research presented in this paper is initially and a part of an ongoing PhD research at the Faculty of Architecture, Planning and Surveying, UiTM to develop a performance measurement tool for PFI projects in Malaysia. The result of the study would provide an insight into the Malaysian construction projects' development and form the basis of a valuable guideline, especially to public and private sectors in Malaysia.

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