

## The Missing Point Of Knowledge Management in PFI Projects

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**Abstract.** The Private Finance Initiative (PFI) procurement model is a complex system which includes long-term commitment; customers' satisfaction and through-life collaborative working. The projects based on this type of procurement has start from the year 1992 in the UK and year 2006 in Malaysia. Along the process, the PFI projects face few problems despite its advantages. These problem has effected the projects performance such as delay and cost overruns. It seems that the problems occurred are repeatable despite many types of research delved into solving the issues. This paper seeks, to find out the most common problems occur in PFI projects and highlights the best solution to tackle the problems. It also looks at whether similar problems occur in Malaysian construction industry. This research has summarised and critically review the literature on the repeated issues and problem in PFI projects which effect the performance of the projects in term of time, quality and money. It was found that similar problems occur and that similar suggestions were proposed. This shows that the proposed solutions have weaknesses somewhat and hence need to enhance further. This research highlighted the potential of incorporating knowledge management concept through its elements to address the problems. Finally, the paper proposes recommendations to improve the performance of PFI projects with the enhancement of knowledge management especially at the initial and planning stage up to bidding stage where the problem reviewed in the literature always occurred

**Keywords:** PFI Issues, Importance of KM, Performance of PFI

### 1 Introduction

A construction project is a complex process that integrates interests of a large number of stakeholders towards the eventual goal of realizing a constructed facility (Oyegoke et al. 2009; Brown et al. 2001). A construction project is organized through varied linkages throughout its life cycle (Bower 2003). Procurement links the highly fragmented supply side of the construction industry (e.g., engineers, architects, contractors, builders, surveyors, suppliers, and laborers) with the less fragmented demand side (e.g., project owners and representatives) (Cox and Townsend 1998). There is various procurement use in the construction industry; these includes conventional, design and build, negotiation, partnering, public, private partnership and Private Finance Initiative (Lædre, et al., 2006). Originated in England in the year 1992 under the United Kingdom's Tory-led government of John Major (Williams, 2005), PFI is a type of Public Private Partnerships (PPP) (Akintoye, et al. 2001). The rationale of PFI is to

combine the resources of the public and private sectors to provide more efficient public services. The Private Finance Initiative is seen as one of the best options for the government to provide facilities and services to the public without waiting longer for the fund Construction Industry Council, 1998). In a PFI procurement, the private sector partner has sole responsibility to get ready the public service such as school or hospital and involved form the bidding stage until construction, in use stage until hand over the back stage. They will also be responsible for the maintenance during in-use stage (Akintola A., Mathias B., 2009).

One reason for the introduction of PFI in Malaysia in the year 2006 is to get the Value for Money in construction projects (Takim et al., 2009). The PFI projects have been successfully implemented in other countries in the world (Takim, R. et al., 2009) for example, like reckons that United Kingdom, Japan, Italy, France, Germany, Australia and USA (Serco, 2007). Starting from 2006, the government in their Ninth Malaysian Plan started to use Public Funding Initiative (PFI)

as one of their way of procuring public projects. When the government first announced it, RM20 billion was allocated for delivering public projects in various sectors such as transport, housing, health care and education projects via PPP (Ninth Malaysian Plan, 2006) which includes 425 projects. Out of that 425 projects, 357 projects are under the Ministry of Education as shown in Table 1.

As in the year 2013, the government is undertaking 52 projects, with an estimated value of 62.7 billion, which are in the construction stage and some already in the operation stage. The government plans to build seven toll highways, five more Universiti Teknologi MARA branch campuses, the Integrated Transport Terminal in Gombak, privatization of Penang Port and redevelopment of Angkasapuri Complex, Kuala Lumpur as Media City (Tenth Malaysia Plan, 2010). Public Private Partnership Department or Unit Kerjasama Awam Swasta (UKAS) up to December 2014 has completed 698 projects including PFI projects.

## 2 Methodology

The research was conducted using an analysis of literature reviews where all the selected journal papers, theses, reports related with PFI had been reviewed and analysed to find out the issues and problems highlighted by the writers. The problems and issues arise then grouped into categories. From each category then we have identified the pattern of problems and issues and find out the main problems from each category. Issues were then analysed in relation to the usage of knowledge management in their solution of the problems

## 3 PFI Nature

PFI projects involve long-term collaboration and networking across different professional groups such as architects, planners, engineers, surveyors, lawyers, financial specialists, facilities management managers and other team members.

Each party has their specific functional relationship in the PFI projects to deliver services according to the public sector clients' output specification (Robinson, H.S., 2009). Each party carries with them not only their specific job description in the project but also tacit knowledge as the result of their action and not all these tacit knowledge were captured, restored, shared and transferred for future usage. Usually, it is embedded with the completion of the projects. Here come the importance of knowledge management.

Human activity cannot be done smoothly without knowledge. Knowledge scope itself are as wide and varied all the varieties of human pursuits. No human civilisation could have existed without creating, accumulation, sharing and applying knowledge (Chimay J.A. et al., 2005). The economic value of knowledge has been discussed for centuries, from the ancient Greeks to Adam Smith and Alfred Marshall, who in 1890 wrote: 'Capital consist in a great part of knowledge and organisation... Knowledge is our most powerful engine in production' (Marshall, 1972). Windrum et al. (1997) and Den Hertog and Bilderbeek (1998) identified design, architecture, surveying and other construction services as knowledge-intensive service sectors.

In order to perform the duty at their best, skills are important as it is their knowledge and experiences (RICS, 2003). Abdullahi A. Umar, et al. (2014) has come out with a list of important skills needed for practitioners dealing with PFI projects. These skills include Contract design skills, Contract Management skills, and Risk Identification and Management skills. For a very complex project such as PFI, the capability refers to the firm's ability to answer a public invitation to tender by drawing up a competitive bid with a high probability of award, on short notice and while minimizing upfront cost. According to Davies and Brady (2000, p. 31), these capability includes the following activities:

Table 1 PFI projects under Ninth Malaysian Plan

425 PFI Projects (based on Ninth Malaysia Plan)	357 projects under Ministry of Education	180 primary schools
		177 secondary schools
	12 UiTM projects	
	2 Youth Training Institution (Institut Latihan Belia)	

- Ability to collect, compile and extract the customer documents after an invitation to tender received from the customer;
- designing a conceptual design with detail components in the proposed construction products;
- estimation of costs, taking into account many factors (e.g., the quality, reliability and cost of components supplied internally or from different suppliers; project management methodology; productivity, etc.);
- defining levels of service;
- risk management;
- scheduling of project work programs;
- choosing of subcontractors;
- preparing the tender document (including contract documents) by integrating information determined in the previous steps.

The above capabilities reflect that the bidding process for PFI projects requires specialized knowledge from, among others, architects, design engineers, cost consultants, tax consultants, lawyers, facility managers and project managers. To integrate such complementary sets of specialized knowledge, an understanding common to all participants regarding the basic categories and building blocks of the bid (e.g., specifications of the projected buildings, scope of services rendered, level of detail of description) as well as regarding the generic process of bid preparation (e.g., standard operating procedures and “who needs to meet with whom to discuss what and at what stage” Cacciatori, 2008, p. 1595) is paramount.

Managing the knowledge during and after the project implementation is a key challenge posed to construction organisation (Udeaja et al., 2008). The construction organisational competitive advantages depend on the capability to learn and adapt faster than its rivals. This capability is strongly dependent on the ability of the organisation to create, acquire, store and use experiences, knowledge, skills and lesson learnt in the past projects that have the potential to enhance the organisational’s future performance (Nonnaka and Von Krogh, 2009). According to Hsiah, et al. (2009) knowledge is vital for effective project implementation, choosing the very best projects, winning bids and also for organizational efficiency. The 1990s interest in KM initially triggered the response that it was about doing things that were new. More recently many organisations have come to realise that it is also a process of discovery. That is, discovering processes that already happen, such as the sharing of knowledge among communitiest of practitioners, that were rarely if ever labelled ‘knowledge management’ (Chimay J.A. et al., 2005).

PFI schemes require both broad PFI expertise and specialized knowledge in particular fields. One difficulty, according to some consultants, concerns the fact that professional advice is expensive, and the fee-budget can- not be accurately predicted. Subsequently, reaching an agreement regarding the fees may also be problematic (A. Akintote, 2003). PFI seldom used by the client organisation, so they have only a few staff that understand the intricacies of PFI. In contrast, some private sector organisations have been involved with several PFI projects and, therefore, have significantly more experience (Robinson, et al., 2004)

A common problem associated with PFI, which is also related to the lack of knowledge are a delay on client’s decision where clients need more time to make decision and longer negotiation period due to lack of PFI experts, and this makes the schedule complete the projects are very tight. Furthermore, because its large-scale involved schemes, high levels of investment and risks involved and limited knowledge transfer between PFI projects (Carillo et. Al., 2006). Knowledge management in PFI then should be seen as one of the considerations in PFI projects due to its benefits to the projects (Robinson, et al., 2010).

#### 4 Analytical Review of Issues and Problem in PFI

The PFI procurement model is a complex system (Sundaraj & Eaton, 2013). Still not reaching its tenth years of implementation which started in the year 2006 (Ninth Malaysian Plan 2006), PFI is considered new in Malaysia compared to a country like the United Kingdom, which has started PFI since the year 1992. The eagerness of using PFI procurement for nowadays projects may be influenced by the benefits that said to be gain once using these procurements which are: 1) Time savings which is shorter construction period (Ward and Chapman, 1995; Price, 2000). (2) Cost savings in term of whole-life price of a scheme produced by PFI compared to by traditional means (PFP, 1995; Grub 1998), (3) helping the public sector financially (Beenhakker, 1997; Jones, 1998; Partnership British Columbia, 2003) (4) the whole cost of the project from construction to maintenance stipulated in the contract (Partnership British Columbia, 2003). Optimal use of assets (Partnership British Columbia, 2003).

However, despite the advantages, there are few issues still occurs in the PFI projects. Review of the literature managed to identify few problems which keep occurring in PFI projects. As shown in Table 2 the problems or issues in PFI can be summarised as follows: (1) Issues associated with value for money 2) Lack

of expertise or professional in PFI projects 3) cost overrun in PFI projects 4) Time overrun/Longer negotiation period 5) Issues with life-cycle costing 6) Aspects of PFI not clear to participants 7) payment deduction 8) Performance of FM in PFI and 8) sustainability of PFI. All these problems and issues have an impact on the performance of the projects whether in term of time, quality or money or even on the three of it. The solution suggested by previous researchers are also tabulated in the table. For example, in the value for money issues, out 12 papers analysed, four of the researchers suggest improving the VfM through assessment model and way of assessing the VfM. Others have their different ways, and only one researcher suggest the use of knowledge management to resolved the VfM issues.

Apparently in every problem or issues syntheses in Table 2 KM element such as the process of capturing, reuse and sharing involved. According to Smyth and Edkins (2007) skills and experiences are tacit knowledge which relates on how individual received and capture new information that they gain and kept it as references for the same future events that might occur. It is not easy to express, highly personal and is in the professional heads. Sharing the knowledge in PFI projects would be difficult especially when the other individual did not have any explicit knowledge of the PFI procurement.

Figure 1 shows how these three elements of KM link together, each of them having a

reciprocal relationship with each of the other two. For example, people help design and then operate Processes, while Processes define the roles of, and the knowledge needed by People. As well as the relationship between the three elements, Figure 1 can also be used to help conceptualise any particular knowledge management initiative, by regarding it as being positioned somewhere in the triangle with the three elements at its vertices. Examples of knowledge management initiatives near the People vertex of the triangle would be implementing directories or communities of practice. Near the Technology Vertex would be implementing repositories or knowledge-based systems. Near the Process vertex would be implementing new ways to work or to build in what you want to achieve, in both cases to achieve knowledge management objectives.

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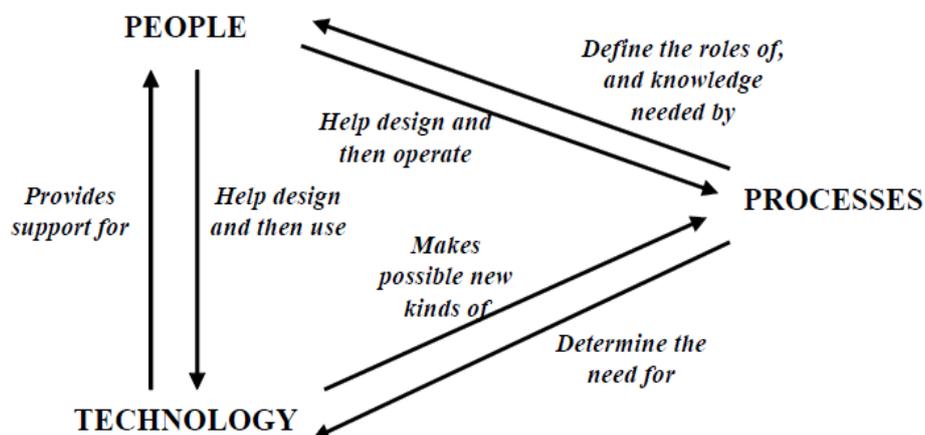


Figure 1 People, processes and technology (Edwards, 2009)

Table 2 The organisation of problems and issues identified from the literature-showing the repetitions and connection with K

Issues Prompted from the synthesis	Resolution	Literatures sources	Performance effected		
			T	Q	M
<b>VALUE FOR MONEY</b>					
Limitation to achieve VfM	Improvement on appraisal and evaluation process	Froud and Shaoul,(2001)		/	
VfM effectiveness	Suggest design for post-project evaluation	Broadbent, et al, 2003			/
Achieving best value for PFI projects	New requirements to achieve the best value should be introduce	Akintoye, et al., 2003			/
Lack of agreed Formulae for VfM stakeholder to benchmark VfM	Identifying principle factors in creating VfM in PFI	(Pitt, et al., 2006)			/
VfM through PSC in PFI	The need for PSC in Malaysia context	(S. Ismail & Rashid, 2007)			/
What are details components of PSC protocol to evaluate VfM.	Development of VfM assessment model	Takim, et al., 2009			/
What are the factors and elements for VfM framework assessment	Identify the VfM criteria for assessment	K. Ismail, et al., 2011			/
Critical parameter influencing VfM in PFI projects	list of critical parameters can help practitioners to identify priority areas and achieve a long-lasting VFM.	(Henjewele, Sun, & Fewings, 2011)			/
VfM still not achievable	Knowledge management as important factor to filling gap in getting VfM	(Henjewele, et al., 2012)			/
The need for VfM Assessment	Model of VfM Assessment	K Ismail, et al., 2012			/
VfM success factors	the knowledge of priority factors that need to enhance the achievement of long-term VFM	(Henjewele et al., 2012)			/
Checking on VfM	Economic, environ-mental and social sustainability should be core consi-derations through-out the lifetime of a ppp/pfi.	(Semple & Turley, 2013)			/
<b>LACK OF PROFESSIONAL/EXPERT IN PFI PROJECTS</b>			<b>T</b>	<b>Q</b>	<b>M</b>
The different levels of PFI experience between onstruction parties and client	The need for knowledge transfer	Herbert, et al., 2004	/	/	/
Lack of skills among practitioners in PFI projects	Enhance the capability and skills of PFI practitioners	(A. A.Umar, et al., 2011), (Abdullahi A Umar, et al., 2014)	/	/	/
Lack of skills among practitioners in PFI projects	The need for knowledge transfers in PFI projects	(Carrillo, et al. 2006a)	/	/	/
<b>COST OVERRUN</b>			<b>T</b>	<b>Q</b>	<b>M</b>

cost and time overrun for health & transport sectors	Knowledge of priority factors that need to be addressed to enhance the achievement of long-term VFM in PFI projects	(Henjeweale et al., 2012)			/
cost overruns due to the cost of the specialist expertise required during the bidding stage and the lengthy negotiation periods	To enhance the knowledge and skills especially client because for client organizations, PFI usually their one-off project.	Carrillo, et al, 2008a)			/
Cost of PFI procurement still higher	Introduction pf PFI2	(Abdullahi A Umar et al., 2014)			/
Charges usually put at the end of the project, "back-end" and the perception that the return of the PFI investors is excessive.	Come out with the calculation and analysis	(Hellowell & Vecchi, 2012)			/
Achieving the best value in PFI project	achievement of best values requirements through the input of few factors	(Akintoye et al.,2003.)			/
large differences of cost estimate between client and contractor &high transaction costs of PFI bids;	To enhance the knowledge of client organization	Robinson, et al., 2004			/
<b>TIME OVERRUN</b>			<b>T</b>	<b>Q</b>	<b>M</b>
Lack of PFI experts	Lack of knowledge transfer	Carrillo, et al., 2006b)	/	/	/
Delay in awarding projects	Lack of expert	m asrul adnan, 2009	/		
the lengthy negotiation period	Lack of knowledge/expertise	Robinson, et al., 2004	/		
The negotiations are lengthy and complex.	Lack of expertise	(Akintoye et al., 2003)	/		
<b>LIFE-CYCLE COSTING</b>			<b>T</b>	<b>Q</b>	<b>M</b>
Failure of QS's contractor to consider LCC	Increased maintenance costs in the future, compared to the original budget for maintenance costs.	(Swaffield & McDonald, 2008)		/	/
Correlation analysis of capital and LCC	Suggest on update of current cost estimate practice, the cost models for LCR costs to be review, surveys are carried out to investigate the issues in cost estimates further	(Wang, 2014)		/	/
<b>ASPECT OF PFI NOT CLEAR TO PARTICIPANTS</b>			<b>T</b>	<b>Q</b>	<b>M</b>
Project technical feasibility	The SPV must demonstrate that the technical aspects of a proposal will satisfy all	(Li, et al., 2005)	/	/	/
Clients' briefs inadequate.	Clients to improve on the of specification of projects	Robinson, 2004	/	/	/
<b>PAYMENT DEDUCTION</b>			<b>T</b>	<b>Q</b>	<b>M</b>
Payment deduction due to performance issue during operation and maintenance	Model of Critical Success Factors	(Oyedele, 2013)		/	/
	to appreciate the value of the partnership	(H. S. Robinson & Scott, 2010)		/	/
<b>PERFORMANCE OF FM</b>			<b>T</b>	<b>Q</b>	<b>M</b>
Performance of FM	Need to include KM in FM	Mustapa, 2013, Carillo&Muzani, 2008		/	/
<b>SUSTAINABILITY OF PFI</b>					

whether sustainable in contract doc exist?	need to identify key elements of sustainable PFI contract	(Farmi,et al, 2011b)	/	/	/
Ambiguity of sustainable contracts & poor implementation of sustainable green elements	facilitate the process of promoting sustainability	(Farmi, et al, 2011a)	/	/	/

For the PFI procurement to success, there is a need for staff with experience in complex procurement with strong knowledge in various area such as technical, commercial and finance (D Tranfield et. al, 2004). As PFI projects itself is very complex, J. Kamara (2012) highlight that to ensure the integration in project development

process, there is a need to enhance on the knowledge management gap first.

Figure 2 show the summary of the analytical analysis of literature review issues or problems arises in relation with PFI.

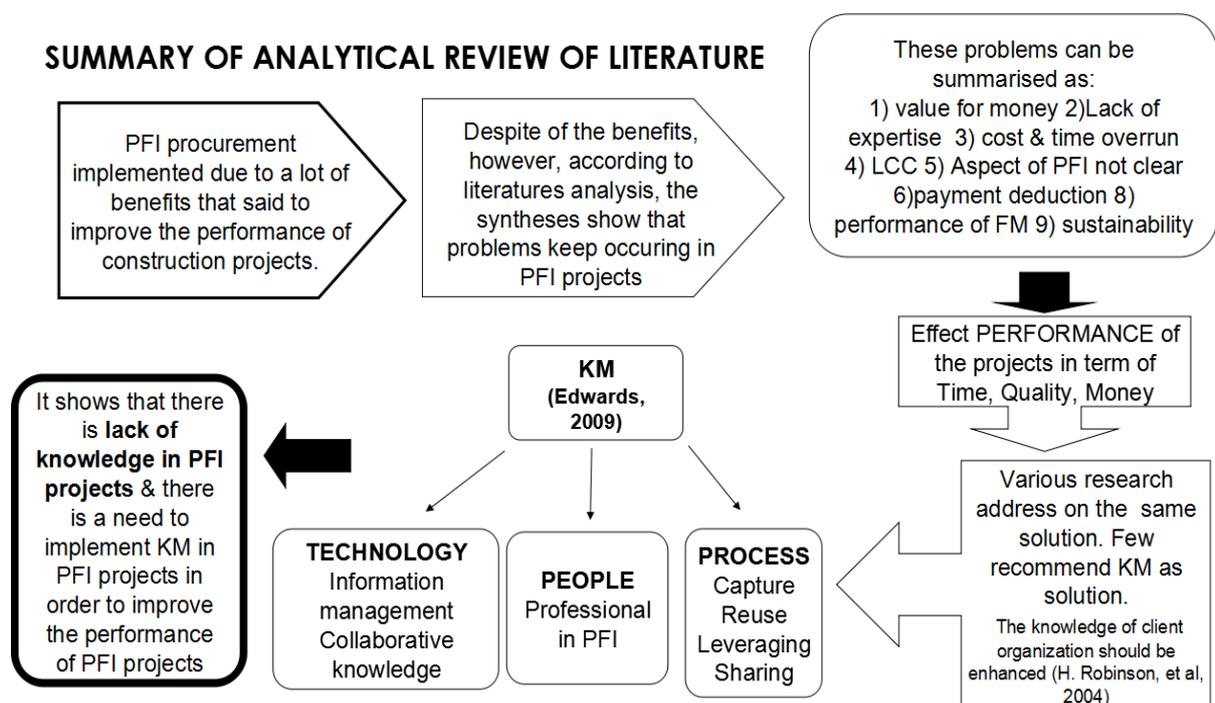


Figure 2: Summary of Analytical Review of Literature

## 5 Management Process

To leverage upon the knowledge infrastructure capability (people, process and technology), KM processes need to be properly in place so that knowledge can be captured, stored, shared and applied effectively (Davenport et al., 1996; Grant,

1996; Leonard, 1995). Knowledge management process involved different stages, and different researchers have their own knowledge management process.

Table 3 shows the stages identified by different researchers.

Table 3 Knowledge Management Process (Addition to H.C. Tan, et al., 2010)

Robinson, et al. (2001)	Kululanga and McCaffer (2001)	Bhatt (2001)	Marquadt (1996)	Gold et al. (2001)	Herbert Robinson, et. al, (2010)	Rollett (2003)
Discovering Locating Capturing Organising Storing Sharing Transferring Modifying Applying Archiving Retirement	Acquiring Creating Storing Sharing Utilising	Creating Presentation Validating Distributing Applying	Acquisition Creation Storage Transfer utilisation	Acquisition conversion application protection	Discovering capturing Archiving retirement Creation and leverage Distribution and sharing Organisation and Storage	Planning Creating Assessing Integrating Organising Transferring Maintaining

Applying all the KM process throughout the stages of PFI is very important as it is one of the element in KM that can enhance the performance of the project in term of time, quality and money.

There are few types of research were done regarding the knowledge management in PFI and highlighted the importance of knowledge management (refer

## 6 Knowledge Management in PFI

Table 4).

Table 4List of knowledge management researches done in PFI

Author	The importance of knowledge	KM involved
P. M. Carrillo, et al., 2006	One way of improving PFI performance is to transfer knowledge from previous projects on to future projects and other PFI teams. He and the team then developed a framework of knowledge transfer based on one of the challenges faced by the construction organisation involved in PFI.	Knowledge transfer
Liyanage, et al., 2009	An empirical study on assessing the process of knowledge transfer in PFI.	Knowledge transfer
Kwawu, et al. 2010	Identified barriers and enablers for knowledge transfer in PFI. They said that practitioners and managers can efficiently design knowledge transfer framework that can be used to overcome the barriers encountered while enhancing the enablers to improve knowledge transfer processes.	Knowledge transfer
(Robinson, et al., 2010.)	Governance & knowledge management for Public-Private Partnership/ Private Finance Initiative	Knowledge management as a whole
(Kamara, 2012)	The need for robust information exchange and knowledge management systems to ensure true lifecycle integration of building information and activities, especially in bridging the gap between client and construction organizations involved in the creation and management of buildings.	Knowledge management as a whole

Author	The importance of knowledge	KM involved
(Hecker, 2012)	The need for collective knowledge in procurement as complex as PFI to ensure the interrelationship and interaction will integrate along the PFI processes.	Collective knowledge
(Mustapa, 2013); Carillo & Mustapa 2008	The importance of knowledge management in FM in PFI projects	Knowledge management as a whole

Most of the researches are done in other countries like UK, Australia, Japan and Hong Kong, which are the developed country. In this research context would be PFI knowledge in Malaysia. From the studies undertaken by previous researchers as discussed above, the practice of KM is important in the PFI projects as it would improve the performance of the projects. Hence, this strengthens the reason to fill in the gap with the implementation of KM in PFI projects.

In Malaysia, there is various research concerning on PPP/PFI had been done, but little research directly on the knowledge management of PFI. Some of the research that had been done are regarding acceptability of PFI in Malaysia (Takim, R., 2009), framework of assessment for value for money (K. Ismail, et al, 2011), key performance indicators for PFI in Malaysia (Syuhaida Ismail, 2009; Mohd Rayme A.M., 2009), delay in awarding PFI project (Mohd Asrul, 2009), issues related to the Public Sector Comparator (PSC) in PFI (S. Ismail & Rashid, 2007), and about the skills of professional involved in PFI (Umar, et al, 2014).

Since the conditions, performance and the nature of the construction organisation have implications for the implementation of KM, KM implementation should be considered in the context of a specific organisation. Malaysia has its way of conducting the procurement (Nurshuhada, et al., 2013). Therefore, the self-styled prescription is required considering the uniqueness of Malaysia PFI projects. A specific KM implementation framework is required for KM implementation in PFI projects in Malaysia. For this reason, further research focuses on developing a KM implementation framework, creating awareness of the KM to sustain highly skilled personnel at all stages of the PFI projects and to improve the PFI projects' performances.

## 7 Conclusion and Recommendation

PFI procurement introduces by the government to brings a lot of benefits that is said to be a gain in the projects. However, problems or issues in PFI still keep recurring. Some of the solutions recommend on the use of knowledge but some still focusing on the same things. The study concludes that there is an urgency to

consider the full use of KM in PFI projects which apparently the usage can be enhanced. Future research is expected to study further the current status and level of implementation of knowledge management in PFI projects in Malaysia. Further study should also be done to find out the barriers and success factors for implementation of KM in PFI projects in Malaysia.

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