

## Influences of Knowledge Sharing in Improving Facilities Management Performance of Private Finance Initiative Projects

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### Abstract

Managing organization performance is very important in supply chain management. The situation is more critical in delivering public demands to develop and supply new facilities under Private Finance Initiative (PFI) projects. Thus, numerous issues and problems occurs in PFI projects that can affect the performance of Facilities Management (FM) phase has been highlighted by many researchers repetitively. This cross-sectional research aims are to discovers the influences of Knowledge Sharing (KS) in improving performance of PFI projects at FM phase. A set of questionnaires was developed and distributed to 151 respondents who is directly involve as practitioners in PFI-FM projects. However, only 111 responses were analysed using the SmartPLS 3.0 software. The finding shows that working culture (WC), staff attitude (SA), motivation to share (MV) and opportunities to share (OP) has significant influences with KS towards performance of PFI projects at FM phase. Meanwhile, nature of knowledge to share (NK) not significantly influences KS in PFI-FM projects.

**Keywords:** Knowledge Sharing, Facilities Management, Private Finance Initiative, Projects, Performance

### Introduction

Managing organization performance is the key to success in business. Therefore, it is important to ensure that all members in the organization aware to its vision, mission and goals (Bryson, 2018). Good management practices in PFI project is very important to ensure the performance of the project is based on the value of money reimbursed by the government (Doherty, Horne, Wootton, Horne, & Wootton, 2014; Gatti, 2013; Zhang & Chen, 2013). If the performance of the project is not comprehensive monitored, this will upset the spending of public money. Generally, PFI projects is very complicated for those still new in this method of deliver public project (Zou, Kumaraswamy, Chung, & Wong, 2014). Previous research shows

that there are numerous issues and problems highlighted constantly (Bing, Akintoye, Edwards, & Hardcastle, 2005; Mu, Jong, & Koppenjan, 2011). Among the related issues are related to the operational performance, defects management, difficulties to understand Key Performance Indicator (KPI), payment mechanism, value for money and the complexity of FM tasks.

The case is more complicated when this type of projects come to service delivery and facilities management stage (Bing et al., 2005). If the stated issues are not addressed properly, it may disrupt the overall performance of the project. This is because at this stage, the facilities management must be conducted according to the standards that has been set for the agreed period of time. Generally, the concession period of FM -PFI is about 20-30 years. There is a study conducted to show that knowledge sharing approach can contribute to improving organizational performance (Hartono & Sheng, 2016). Based on previous studies and workshops carried out by authors, a conceptual model was developed. The development of this model is to measure the influence of each related factor. Thus, the main aims of this paper are to discovers the influences of knowledge sharing in improving FM performance of PFI projects.

### Research Conceptual Framework

Based on Figure 1 below, it shows the conceptual framework for this research. This conceptual framework was described in the relations between determinant factors with the knowledge sharing towards performance management. In this study, the conceptual model is developed based on 22 items which are grouped into five determinant factors group namely Working Culture (WC), Staff Attitude (SA), Motivation (MV), Nature of Knowledge to Share (NK) and Opportunities to Share (OP). The determinant factors and each item are labelled with oval shape and rectangular shaped respectively.

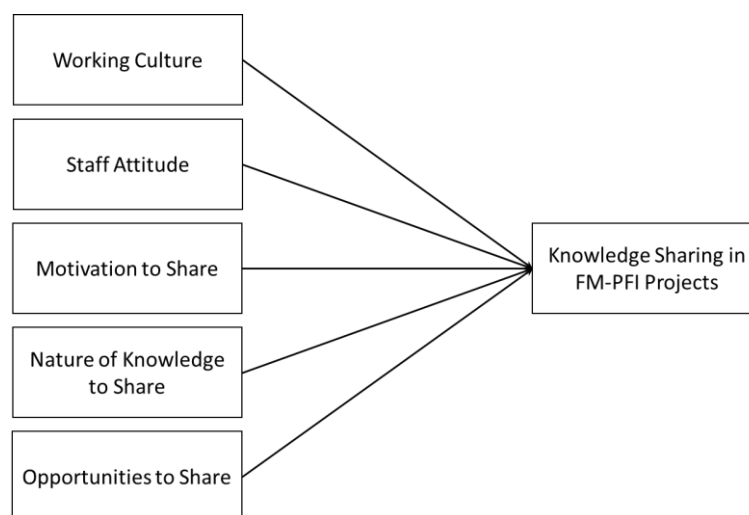


Figure 1. Research Conceptual Framework

### Working Culture

Commonly, working culture is the thought that generates values and beliefs in the organization. This progression naturally embraces of beliefs, thought processes, values and expanded from the attitude of personnel (Hofstede, 1983; Pettigrew, 1979; Schein, 2010). Previous research found that there are several factors that can contributes in emerging

valuable working culture in the organization. The characteristics for working culture are tendency to be fairness with others (Connell, Ferres, & Travaglione, 2003; Sholihin, Pike, Mangena, & Li, 2011; Williamson & Williams, 2011), bringing organization creativity to high level (Bendell, 2006; DiLiello & Houghton, 2006; Martins & Terblanche, 2003), responsive to the organization vision and mission (Collins & Porras, 1991; Jovanovic, 2011; van Riel & Balmer, 1997), stimulating and tolerant with diversity (Janssens & Steyaert, 2003; Silverberg, Dosi, & Orsenigo, 1988), enlightening social ties with others (Chambers, 2006; Fliaster & Spiess, 2008; Wang, Ashleigh, & Meyer, 2006), the effect of inclusive team characteristics (Ng, 1980; Tranfield, Smith, Foster, Wilson, & Ivor Parry, 2000; Yeo, 2002), and innovation culture within the organization (Martins & Terblanche, 2003; Nooteboom, 1999; Silverberg et al., 1988).

### **Staff Attitude**

Staff attitude is a major consent to confirm that they are participate in improving the organization performance. In general, attitude is described as psychological or emotional condition of concentration, the probability dimension, a belief can transform individually (Davidson, 2013; Eagly & Chaiken, 2007; Fishbein & Raven, 1962). In every organization, staffs can have either an optimistic or bad attitude. This attitude will influence on specific work activities, services delivery, groups or management. For example, staff with bad attitudes normally not focus to daily tasks (Ross & Goldner, 2009; Vakola & Nikolaou, 2005). In this study, the characters of Staff Attitude consists of openness mindset (Levy, Beechler, Taylor, & Boyacigiller, 2007; Story & Barbuto, 2011), feel enjoy to helping others (Lin, 2007; McLure Wasko & Faraj, 2005; Wright & Pandey, 2008), voluntary mentoring new staff (Weng et al., 2010), senses of responsibility to organization (Gilman, 1999; Lindkvist & Llewellyn, 2003), being proactive (Parker, Bindl, & Strauss, 2010; Strauss, Griffin, & Rafferty, 2009), and loyalty to the organization management (Schrag, 2001).

### **Motivation to Share**

Fundamentally, motivation is the major forces to drive persons towards actions, desires and needs. Thus, motivation also has significant role in influencing individual to share their knowledge to others. This study explores that motivation has amounts of characters to look thoroughly. The characters for motivation to share consists of rewards and recognition to the employees (Iqbal, 2015; Kasim, 2015), sense of belonging and trust among employees (Keh & Xie, 2009; Zhao, Lu, Wang, Chau, & Zhang, 2012), providing training and development for the staffs (Scott & Nelson, 1999; Shen & Darby, 2006), reciprocity of knowledge, management support and job satisfaction (Ipe, 2003; Tamjidyamcholo, Bin Baba, Tamjid, & Gholipour, 2013).

### **Nature of Knowledge to Share**

The important of knowledge is the nature of knowledge itself. This philosophy also known as epistemology where the justification of the nature and human knowledge (Audi, 2010; Hughes, Sharrock, & Sharrock, 2016). This phenomenon has been ascertaining from the earliest times. In this study, the main focus is the availability and accessibility of the knowledge. Among the characters for nature of knowledge to share consists of value of the knowledge (Ipe, 2003), either it is tacit and explicit knowledge (Nonaka & Takeuchi, 1995), access and benchmarking to the knowledge, and quality of the knowledge (Maier & Hadrach, 2006; Syed-Ikhsan & Rowland, 2004).

### **Opportunities to Share**

Before sharing the knowledge, there must be opportunities that can accepted the process. Therefore, opportunities to share also plays an important role in sharing existing knowledge. In this study, the characters of opportunities to share consists of by knowing knowledge as power (Ipe, 2003; Marglin, 1984), technology and infrastructure are well established (Issa & Haddad, 2008; Neches et al., 1991), allocation of specific time, knowledge self-efficacy among organization members (Hsu, Ju, Yen, & Chang, 2007; Nonaka, Toyama, & Nagata, 2000), system quality and communication skills (Cabrera & Cabrera, 2005; de Vries, Bakker-Pieper, & Oostenveld, 2010).

### **Methodology**

The main objective of the study is to examine the relationship between identified determinant factors of individual beliefs towards knowledge sharing in Facilities Management of Higher Learning Institution under Private Finance Initiative projects. Also, simultaneously proposed the research structural model. The analysis was conducted using Structural Equation Modelling approach. Therefore, PLS-SEM software was applied to analyses the data. The analysis was carried out in two stages: the measurement model analysis and the structural model analysis. The measurement model assessment involved an examination of the adequacy of the scales by analyzing the relationships between each determinant factors and items. In contrast, the examination of the structural model focuses on testing the causal paths between the determinant factors and knowledge sharing towards performance management of Facilities Management of Higher Learning Institution under Private Finance Initiative projects.

### **Results**

The main objective of the study is to identify the influences of knowledge sharing in improving performance of Private Finance Initiative projects at Facilities Management phase. The results on the analysis for the research objective were explained below. In order to achieve the research objective, respondents who directly involved in facilities management under private finance initiative projects were identified and invited to take part in this survey. Frequency descriptive analysis was carried out to obtain background information of the respondents who answered the questionnaires. Background information on respondents who answered the questionnaire consists of several categories, gender, age, academic qualification, position in the FM organization, and experiences of the respondents in FM-PFI projects.

A total of 151 questionnaires were distributed via web-based self-administrative questionnaire. Out of 151 questionnaires distributed, only 114 responses were recorded and completed. Apart from the questionnaire survey there are 2 reverse questions included to increase confident level on the responses. Further evaluation on the responses, only 111 responses were considered valid for analysis and 3 responses were rejected for negative response on reverse questions. Therefore, responses rate for this survey is 74 percent which is considered high responses for small populations. Details of the total number of data acquisition and returned questionnaire is shown in Table 1.

The questionnaires were specifically answered by respondents from practitioners' who has participate in facilities management of higher learning institution under private finance initiative projects. The clear majority of the respondents have bachelor's degree with 45 respondents (40.5%), followed by diploma with 37 respondents (33.3%) and certificate

with 29 respondents (26.1%) as their highest educational qualification. In terms of position in organization, the highest responses are from Assistant Engineers (Civil / Electrical / Mechanical) with 44 respondents (39.6%) and followed by Engineers (Civil / Electrical / Mechanical) with 30 respondents (27%). Meanwhile, Facility Managers and Building Surveyors is considered medium with 15 respondents (13.5%) and 11 respondents (9.9%) respectively.

The lowest response is from Quantity Surveyor and Architects / Landscape Architects with 8 respondents (7.2%) and 3 respondents (2.7%) respectively. It is clearly reflecting the reality of organization hierarchy in facilities management of higher learning institution under private finance initiative projects where dominated by assistant engineers. Then, the respondent's experiences in facilities management were identified with the highest responses from respondents that have 3 – 5 years experiences (26.1%), followed by respondents with 6 – 8 years experiences (24.3%) and more than 10 years experiences (22.5%). The lowest response is from respondents that have 9 – 10 years experiences and less than 2 years experiences with 14.4 percent and 12.6 percent respectively.

Table 1

*Overall data acquisition for data analysis*

	Frequency	Percent	Valid Percent
Questionnaire distributed	151	100	100
Questionnaire not answered	37	25	25
Questionnaire answered	114	75	75
Valid answer for analysis	111	74	74

Table 2

*The Demographic Profiles of the respondents*

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	80	72.1	72.1	72.1
	Female	31	27.9	27.9	100.0
	Total	111	100.0	100.0	
Age	21 – 30 years old	14	12.6	12.6	12.6
	31 – 40 years old	65	58.6	58.6	71.2
	41 – 50 years old	26	23.4	23.4	94.6
	51 – 60 years old	6	5.4	5.4	100.0
	Total	111	100.0	100.0	
Qualification	Certificate	29	26.1	26.1	26.1
	Diploma	37	33.3	33.3	59.4
	Bachelor's Degree	45	40.5	40.5	100.0
	Total	111	100.0	100.0	
Position	Facility Manager	15	13.5	13.5	13.5
	Building Surveyor	11	9.9	9.9	23.4
	Quantity Surveyor	8	7.2	7.2	30.6
	Engineer (Civil / Electrical / Mechanical)	30	27.0	27.0	57.6
	Architect /	3	2.7	2.7	60.3
	Landscape Architect				
	Assistant Engineer (Civil / Electrical / Mechanical)	44	39.6	39.6	100.0
	Total	111	100.0	100.0	
FM Experiences	Less than 2 years	14	12.6	12.6	12.6
	3 – 5 years	29	26.1	26.1	38.7
	6 - 8 years	27	24.3	24.3	63.1
	9 - 10 years	16	14.4	14.4	77.5
	More than 10 years	25	22.5	22.5	100.0
	Total	111	100.0	100.0	
PFI Experiences	Less than 2 years	59	53.2	53.2	53.2
	3 – 5 years	43	38.7	38.7	91.9
	6 - 8 years	2	1.8	1.8	93.7
	9 - 10 years	4	3.6	3.6	97.3
	More than 10 years	3	2.7	2.7	100.0
	Total	111	100.0	100.0	



### Measurement Model Assessment

The assessment of measurement is essential and necessary as it provides thorough testing for the reliability and validity of the scales. It is also employed to measure the latent constructs and their manifest variables (Loehlin, 1998). Several stages were used in the assessment of the measurement model. According to Henseler, Hubona and Ray (2016), they suggest four criteria of model assessment. These criteria comprise the assessment of indicator reliability; internal consistency reliability; convergent validity; and discriminant validity at indicator and construct levels.

### Convergent Validity

Convergent validity specifies that items that are indicators of a construct should share a high proportion of variance (Hair, Black, Babin, & Anderson, 2010). The convergent validity of the scale items was assessed using three criteria. First, the factor loadings should be greater than 0.50 as proposed by (Hair et al., 2010). Secondly, the composite reliability for each construct should exceed 0.70. Lastly, the Average variance extracted (AVE) for each construct should be above the recommended cut-off 0.50 (Fornell & Larcker, 1981).

All loadings were greater than 0.40, with most loadings exceeding 0.60 except loadings for the AVE. The factor loadings ranged from 0.501 to 0.963. Items with loadings less than 0.70 can still be considered significant (Hair et al., 2010). The high factor loadings give reason to conclude that the measures have convergent validity. All constructs factor loading exceeded the 0.50 cut-off, with the exception of AVE.

Normally, the acceptable AVE threshold is 0.5 (Hair et al., 2010). But, for this research the AVE is less than 0.5 and considered as insufficient. According to Ping (2009) even if AVE is lower than 0.5 this is not fatal in testing of new model. Besides, not all scholars accept AVE as crucial to establish convergent validity. Low AVE at an initial stage of model testing should be viewed as exploratory and accepted until perfect observation is attained. Further, for some case AVE less than 0.5 is also can be acceptable (Fornell & Larcker, 1981). Yet, every determinant factor was found to have adequate convergent validity based on their good composite reliability ( $>0.60$ ). As summary, based on results in Table 3 it shows that the study's measurement model has demonstrated an adequate convergent validity.

Table 2

### Convergent Validity

Determinant Factor	AVE	Composite Reliability	Cronbach's Alpha
Working Culture	0.296471	0.654777	0.886339
Staff Attitude	0.294805	0.625691	0.858933
Motivation to Share	0.541381	0.746521	0.818055
Nature of Knowledge to Share	0.349878	0.556700	0.796649
Opportunity to Share	0.315885	0.623885	0.851403
Knowledge Sharing	0.392566	0.763010	0.924021

### Discriminant Validity

The next step in the construct validation process is the assessment of discriminant validity. Discriminant validity reflects the extent to which the measure is unique and not simply a reflection of other variables (Peter & Churchill, 1986). Each dimension of a construct should be unique and different from the other even though each reflects a portion of that

construct. There are several ways to evaluate discriminant validity. Average Variance Extracted (AVE) is a common method of testing discriminant validity (Anderson & Gerbing, 1988). Discriminate validity was evaluated by examining the cross loadings of each item in the constructs and the square root of AVE calculated for each construct. All the items should have higher loading on their corresponding construct than the cross loadings on the other constructs in the model.

Table 3

*Discriminate validity*

	AVE	Working Culture	Staff Attitude	Motivation to Share	Nature of Knowledge to Share	Opportunities to Share	Knowledge Sharing
Working Culture	0.296471	<b>0.544*</b>					
Staff Attitude	0.294805		<b>0.543*</b>				
Motivation to Share	0.541381			<b>0.713*</b>			
Nature of Knowledge to Share	0.349878				<b>0.588*</b>		
Opportunities to Share	0.315885					<b>0.560*</b>	
Knowledge Sharing	0.392566						<b>0.626*</b>

Note: \*The values of diagonal AVE are greater than the off-diagonal AVE; where diagonal values present the AVE values.

**Structural Model Assessment**

The second assessment is structural model assessment. This is done when a reliability and validity of measurement model has been established. The structural model tests the relationship between the determinant factors and knowledge sharing with the help of a path diagram. There are two aspects of assessment in a structural model assessment which are (i) Explanatory Power; and (ii) Predictive Power. The criteria for Explanatory Power include Coefficient of Determination ( $R^2$ ) and the Effect Size ( $f^2$ ). Meanwhile, Predictive Power includes Path Coefficient ( $\beta$ ); Predictive Relevance ( $Q^2$ ); and Relative Impact ( $q^2$ ).

**Predictive Power**

The next step is assessing the path coefficient of all determinant factors (paths) by comparing beta ( $\beta$ ) values among all the paths. The path coefficient represents the hypothesized relationships. The highest  $\beta$  value indicates the strongest relationship of determinant factors (independent variables) towards Knowledge Sharing in FM- PFI projects (dependent variables). According to Hair, Sarstedt, Hopkins and Kuppelwieser (2014) it is suggested that path coefficients should exceed 0.10 to account for a certain impact within the



model. However,  $\beta$  value has to be tested for its significance level through t-value test. The test is carried out by performing a non-parametric bootstrapping technique (Chin, 1998).

In this research, bootstrap re-sampling method was employed to test the statistical significant of each path coefficient. The number of resample iterations is 5000 to generate a stable estimation as suggested by Henseler et al., (2016). According to Hair et al., (2014), it is suggested that acceptable t-values for a two-tailed test are 1.64 (significance level = 0.10 or 10%), 1.96 (significance level = 0.05 or 5%) and 2.58 (significance level = 0.01 or 1%). The bootstrapping result shown in Figure 2.

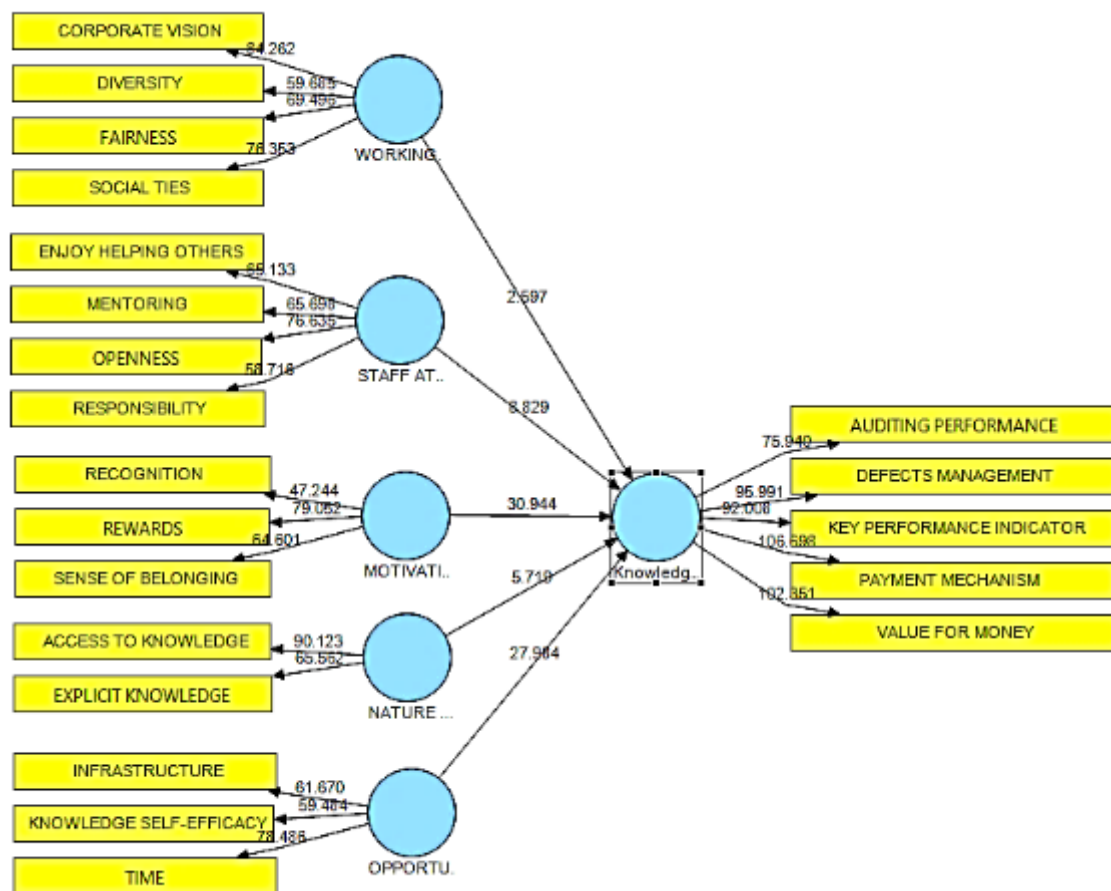


Figure 2. Bootstrapping analysis to predict power

Table 4

Results of hypothesis tests

Hypothesis	Relationship	Path Coefficient / $\beta$	t-value	Remarks
H1	Working Culture > Knowledge Sharing in FM-HLI-PFI projects	0.050	2.597***	Significant
H2	Staff Attitude > Knowledge Sharing in FM-HLI-PFI projects	0.173	8.829***	Significant

H3	Motivation to Share > Knowledge Sharing in FM-HLI-PFI projects	0.433	30.944***	Significant
H4	Nature of Knowledge to Share > Knowledge Sharing in FM-HLI-PFI projects	-0.059	8.829***	Not Significant
H5	Opportunities to Share > Knowledge Sharing in FM-HLI-PFI projects	0.348	27.984***	Significant

*Results from Table 5 show that the  $\beta$  values attained are higher than the cut-off point value of 0.01 for working culture, staff attitude, motivation to share and opportunities to share as suggested by Hair et al., (2014). The highest  $\beta$  value for determinant factor which has the most significant relationship with knowledge sharing are the motivation to share ( $\beta = 0.433$ ) and followed by opportunities to share ( $\beta = 0.348$ ). The next step is to discuss in detail on each hypothesis resulting from this analysis. The t-values are higher than minimum cut-off significance value which is at least 0.01 or 1%. This indicates that Working Culture, Staff Attitude, Motivation to Share and Opportunities to Share factors have significant relationship. Meanwhile, only one factor (Nature of Knowledge) have insignificant relationship with knowledge sharing in Facilities Management of Private Finance Initiative Projects.*

### Conclusion

Based on finding from this research, from 5 hypotheses only 4 has significant influences on knowledge sharing in improving performance of private finance initiative projects at facilities management phase. It is found that the hypothesis for Nature of Knowledge is not accepted. The other hypotheses such as Working Culture, Staff Attitude, Motivation to Share and Opportunities to Share is accepted. It is suggested that longitudinal research approach to be conducted for future research. The aim is to study the effects of Knowledge Sharing after particular organization boost some incentive and encouragement towards performance management based on the 4 determinant factors.

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