

The Influence of Project Life Cycle and Key Performance Indicators in Project Management Performance: Comparison between ICT and Construction Project

Norshima Humaidi¹ and Noor Azzah Said²

¹ Faculty of Office Management & Technology, UiTM, Malaysia

² Faculty of Office Management & Technology, UiTM, Malaysia

Abstract. Project has become one of the important elements in both ICT and Construction companies. To ensure project success, project manager must have good skill in project management. Previous researches have revealed that there is several factors influences project management performance. However, the study has posited two factors which are project life cycle (PLC) and key performance indicators (KPIs). This study was conducted to examine the effect between those factors on project management performance in ICT and construction project. This study also was aimed to compare the mean result of both type of project using Independent T-Test. The result of analysis reveals that both factors have influence project management performance in ICT and construction project. The T-Test result is also shown that there is no significant different between ICT and construction project. The number of respondent was 156 project managers from ICT companies and 346 project managers from construction companies in Klang Valley, Malaysia. The findings of the study will hope to help project manager in improving their project management skills.

Keywords: project management performance, project life cycle, key performance indicators, project success

1. Introduction

Projects had clearly become a central activity in most organizations and companies and they are rapidly increasing their investment resources in projects such as new product development, process improvement, or building new services. Moreover many studies indicated that most projects do not meet time and budget goals, or fail to satisfy customer and company expectation [1]. Notwithstanding, other factors also contributed to the failure of projects such as weaknesses in project mission and planning, lack of project knowledge, communications breakdown, lack of resources, political issue, control issues, lack of top management support, lack of technical expertise, etc. Therefore, project manager play an important role and practice good project management. Project management practice is seriously considered in ICT and construction project because both projects are dynamic.

At the moment, project management has become a key activity in most modern organization [2]. To ensure the success of a project, every organization needs to adapt good project management practices. Previous research viewed project performance as an intangible thing, especially in case of management performance, so choosing tools for assessing the performance is also a hard job [3]. Performance measurements is the heart of ceaseless improvement and the aims of project management performance is offering managers and members of staff of all ranks the ability to develop direction, traction, and speed of their organization. Adapting good approach in managing project can improve project managers' effectiveness and efficiency of products and processes. As project management is becoming an important task to an organization, it is worthwhile to explore the factors that can enhance project management competencies.

This study was conducted with the aim to determine the effect of Project Life Cycle (PLC) process and Key Performance Indicators (KPIs) on project management performance in ICT and construction companies in Klang Valley, Malaysia.

2. Background of Hypotheses

To develop conceptual framework, several studies regarding to project management performance (PMP) have been reviewed. Based on the finding, researcher have decided to adapt PMPA model but focusing on PLC and KPIs as an independent variable in this study. Meanwhile, PMP is dependent variable.

2.1. Project Life Cycle

The primary challenge of project management is to achieve all the project goals and objectives while honoring the preconceived project constraints [4]. Typical constraints are scope, time, and budget. The secondary challenge is to optimize the allocation and integration of inputs necessary to meet pre-defined objectives. Thus, project manager must understand and adopted good project management approach. Critical to these informal project management approaches are an appropriate methodology and an understanding of the life cycle phases [5]. Therefore, the right methodology chosen in PLC is important. PLC is the concept whereby project will be divided into several stages which are planning, analysis, design, implementation and maintenance as basic. It has subsequently been proposed that the theoretical system life cycle phases should be applied to a project [5]. There are several approaches that can be taken to managing project activities such as agile, interactive, and incremental and phases approaches. As a person who lead the project, project manager have a responsibility to choose best method in managing project. Moreover, careful consideration needs to be given to clarify surrounding project objectives, goals, and importantly, the roles and responsibilities of all participants and stakeholders. Hence, this study stated hypothesis as below:

H1: The factor of Project Life Cycle (PLC) Management influence PMP.

2.2 Key Performance Indicators

KPIs are one of the factors that constitute the project success criteria [6]. KPIs are helpful to compare the actual and estimated project performance in terms of effectiveness, efficiency, and quality of workmanship and product [7, 6]. KPIs can be used to measure the performance of project operation and usually used in construction project. Moreover, performance measurement can be carried out by establishing KPIs which offer objective criteria to measure project success [6]. Traditional project performance measurement can be measured by three factors which are cost, time and project quality. Previous researcher argued that the measure of project success can no longer be restricted to the traditional indicators [8]. They advocate the expansion of success measurement towards project management success or product success or both. Other research has stated that KPI is useful tool to investigate and manage change in construction project [8]. Thus, KPIs also can be used to measure project management performance. This study suggested hypothesis as below:

H2: The factor of Key Performance Indicators (KPIs) influences PMP.

2.3 Research Framework

In the process of developing a conceptual framework for determine the effect of PMPA factors on PMP which is adapted by Qureshi et al. [3], this study posits two factors: (1) PLC and (2) KPIs. The research conceptual framework is developed in figure 1.

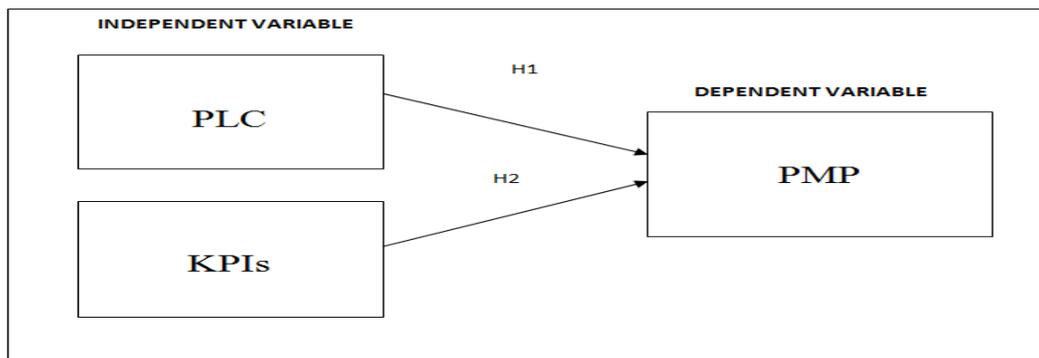


Fig 1: Conceptual Framework

3. Methodology

3.1 Contexts and Participants

The participants of this study were projects managers from ICT and construction companies in Klang Valley, Malaysia. A total of 550 questionnaires were distributed by paper and email. However, only 502 questionnaires were obtained and valid. Most of the respondents are from construction companies (n = 346) compare to ICT companies (n = 176). The respondents were asked to describe themselves in reference to a 5-point Likert-type scale, with anchors ranging from 1 (strongly disagree) to 5 (strongly agree).

3.2 Instruments

A questionnaire was developed for examining the relationship between PMPA factors (PLC and KPIs) and PMP. In doing so, 41 items of questionnaire was developed and adapted from previous research with response options ranging from strongly disagree (1) and strongly agree (5) and 4 items for demographic details. The questionnaire is based on the questionnaire by [3]. However, the questionnaire has slightly modified based on the suitability and necessity of the study.

To test the validity of instruments, the questionnaire which constructed has been submitted to an expert to check the validity of the items for ensuring a high-quality measure. Cronbach Alpha was used for the purpose of reliability measurement. The purpose of Cronbach Alpha is to find out how well the item in a set positively correlate to one another. Cronbach Alpha coefficients of all the variables were well over 0.80 which indicated that the internal reliability of the individual constructs was quite high. The result is indicated to both ICT and construction project. The internal reliability of overall model in ICT project was also found to be 0.940 which an excellent result. The result for construction project was slightly different than ICT, 0.848. This value indicated that the questionnaire was suitable for the purpose of study as value more than 0.7 is considered as an excellent [9]. In [9] clarified that the higher the coefficient, the better the measuring instrument or it can be understood that the closer reliability coefficient gets to 1.0, the better.

The design of the study is quantitative. Thus, researcher decided to choose SPSS version 17.0 as a statistical tool and the data have been analyzed using The Pearson Moment Correlation Coefficient and multiple regression. The tool has been chosen because it is convenience for the researcher to conduct an analysis and is already well known as the best tool. Research objective is to determine the effect of PLC and KPIs on project management performance in ICT and construction companies. Therefore, the best analysis to be used is multiple regressions. Table 1 is the summary of reliability analysis in this study.

Table 1 (a): Overall reliability analysis

Type of Organization	Cronbach's Alpha
ICT	.940
Construction	.848

4. Result

The Pearson correlation was used for conducting relationship test of the structural model. Hypotheses 1 and 2 proposed that PLC and KPIs was positively influences the project management performance on both type of project. Results of analysis reveals that ICT's KPIs ($r' = 0.557$) was the stronger influences on PMP than ICT's PLC ($r' = 0.547$). Meanwhile, construction's KPIs ($r' = 0.425$) was slightly different than construction's PLC ($r' = 0.420$). Thus, both factors are important in ICT and construction project. In addition, consistent with much of the prior research, both factors had significant effects on PMP with strong relationship based on the analysis result as shows in table 2.

Regression model with KPIs and PLC as the predictor explains 35.8% of the variances in ICT's project management performance and 21.9% of the variances in construction's project management performance as stated in table 3 (a). Regression analysis also reveals that both factors are significant over PMP as stated on table 3 (b).

As stated on table 4, the test equality of variances (Lavene's test) result is shown that the variances of PLC and KPIs for ICT and construction project are equal (KPIs sig. value = $0.624 > 0.05$; PLC sig. value = $0.061 > 0.05$). Based on result of equal variances assumed is also shown that there is no significant different between ICT and construction project (KPIs sig. value = $0.359 > 0.05$; PLC sig. value = $0.378 > 0.05$).

Table 2: Correlations

		ICT's PMP	Construction's PMP
Pearson Correlation	PMP	1.000	1.000
	PLC	.547	0.420
	KPIs	.557	0.425
Sig. (1-tailed)	PMP	.	.
	PLC	.000	.000
	KPIs	.000	.000
n	PMP	156	346
	PLC	156	346
	KPIs	156	346

Table 3 (a): Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	Project Management performance			
1 (ICT)	.598a	.358	.350	.45305
1 (Construction)	.468	.219	.214	.47980

a. Predictors: (Constant), KPIs and PLC

Table 3 (b): Regressions

Model		Result					
		B (ICT)	B (Const.)	T (ICT)	T (Const.)	Sig. (ICT)	Sig. (Const.)
1	(Constant)	1.732	2.096	6.315	9.548	.000	.000
	PLC	.318	.272	3.363	4.128	.001	.000
	KPIs	.326	.272	3.743	4.312	.000	.000

Table 4: Independent Sample Test

Variables	Levene's Test for Equality of Variances	t-test for Equality of Means								
									95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
PLC	Equal variances assumed	3.527	.061	-.883	500	.378	-.04399	.04980	-.14183	.05386
	Equal variances not assumed			-.860	280.929	.390	-.04399	.05114	-.14465	.05668
KPIs	Equal variances assumed	.241	.624	-.918	500	.359	-.04838	.05271	-.15195	.05518
	Equal variances not assumed			-.880	271.020	.380	-.04838	.05499	-.15665	.05988

5.

The results indicated that KPIs is the most important factor in both ICT and construction's project management performance compare to PLC. The result comparison between both projects was no significant difference. Result analysis done by [3] also reveals that KPIs is the most important factor. Other researcher suggested that "*KPIs are important to ensure high levels of PMP, and which ones should be aligned in practices to make a qualitative judgment on success of construction projects in developing countries*" [8]. Even though PLC has lowest result than KPIs, however, PLC still important as it need to be seriously considered by project manager when managing project. PLC consists of several stages that need to be control to ensure the effectiveness and efficiency of end result.

PLC and KPIs have been agreed by most of the respondents as an important factors and the results of analysis also revealed that both have strong influence on PMP. Previous research also stated that KPI and PLC have an impact to PMP [3, 5, 6 and 10]. Thus, project manager who manage ICT and construction project should considering on this two factors. Understand how to control all the stages in PLC also can contribute to the success of project management. Using KPIs as benchmarking approach can helps ICT and construction companies determine the performance of project management. Therefore, it can improve the way of project manager and project team run the project. Project team will hope more focus and give full cooperative if the companies constructing clear KPIs of project performance. Future research should study on how to constructing better KPIs approach to determine project management success and investigated other moderator factor such as knowledge.

6. Acknowledgement

Praise to The Almighty Allah for giving us the time, strength and patience in completing this study. Our thanks and appreciation goes to our friends at ICT and construction companies for their help and assistance. Without their cooperation, we would not be able to complete the study. Lastly, our thankfulness goes to our family for their support and encouragement throughout the performance of the study and Ministry of Higher Education (MOHE), Malaysia which provide us with the information and grants.

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