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Measuring the Impact of Knowledge Management on IT Project Management at IT Companies in Jakarta

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Abstract

This research will discuss how KM affects IT project management in one of IT Companies in[2] Jakarta. The problem which is being faced right now is that the KM factors that affect IT project management in the completion and satisfaction aspect is unknown. This research aims to determine the KM factors that affect the IT project management. Data collection is performed by handing out questionnaires to all the employees of the IT Department in the company to measure the predetermined variables. Analysis and hypothesis testing in this research will use a statistical method with the Partial Least Square (PLS) approach, which is performed using SmartPLS v.3.2.7 software. The research results will be in the form of analysis that aims to help the IT Department of the company to improve its IT project management in the completion and satisfaction aspect based on the KM factors being researched.

Keywords*: Knowledge, Knowledge management, KM factors, Information Technology project management*

1. Introduction

In the recent years, many companies strive to find a way to keep improving so that they can survive in the global competition which is getting tighter. Ways such as devising new strategies, innovating, establishing new policies, *etc.* have been used so that the company can keep growing rapidly. But with the competition getting tighter, companies are forced to find new ways so that they can survive in the flow of business development. To grow and survive in such a world, organizations must keep learning and improve their knowledge so they can provide improving and innovative goods or services [1].

Knowledge helps an organization to build innovative and creative strategies to give the organization competitive advantages over other organizations [2]. Knowledge becomes one of the important assets that can be used by many people concurrently and will keep improving through its utilizations and distributions [3]. With the increase of demand for useful knowledge, the organization is also required to be able to handle the knowledge appropriately. The process of capturing, improving, sharing, and effectively utilizing the knowledge in the organization is known as Knowledge Management [4].

Knowledge Management (KM) regulates on how knowledge can be captured, organized, distributed, and rapidly provided in large quantities to the company [5]. KM utilization must be aligned to the business goals and objectives so that it can benefit the organization [2]. Appropriate utilization of KM, may increase the efficiency and productivity of the employees by reusing the knowledge the company had [6]. Right now, KM and learning process have been a major factor for achieving a long term competitive advantage [7].

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Currently, KM has been implemented in many IT companies in Jakarta, Indonesia. It is applied to support operational activities of the company, one of which is in IT project management. But in the various KM applications, the KM factors that can affect IT project management from the completion and satisfaction aspect of the IT project itself, is unknown. From that problem, this research is aimed to solve the problem.

2. Literature Review

2.1. Knowledge Management (KM)

KM is an effective learning process that is associated with knowledge exploration, exploitation, and classification (tacit and explicit) which uses the appropriate technology and environment to improve the intellectual capacities and performance of the organization [8]. KM creates a systematic coordination inside the company in managing human resources, processes, technologies, and its organizational structure in order to increase value through innovations and reuse of existing knowledge [9].

KM becomes a practice in the organization to manage knowledge selectively through decision making experiences in the past, to make decisions in the present and future in order to increase the organization's effectiveness [10]. Nowadays, an organization's success strongly depends on how the organization collects, deposits, and retrieves the sharing of knowledge among employees in the organizational level effectively [11].

2.2. KM Enabler

KM enabler is an organization's mechanism to expand its knowledge, and also stimulate the creation of new knowledge in the organization, as well as the sharing and protection of it [12]. From a previous research, there are four general KM enablers which affects the implementation of KM: strategy and leadership, culture, technology and infrastructure, and also human resources [13].

The strategy and leadership factor must be aligned with the business strategy to help the organization in reaching its goal [2]. There is a relationship between the role of the leader and the KM strategy itself, which is that leadership style plays an important role in the creation and management of knowledge inside the organization [14]. Top management must understand the importance of KM, so that they can support and play an aggressive role in the decision making [12]. A leader must be able to create a condition which allows everyone to utilize the KM system and shape their experiences and abilities using the system, participate through their knowledge in the knowledge repository, and have easy access to relevant knowledge [15].

The cultural factor is very important in facilitating the process of sharing, learning, and creation of knowledge [12]. One of the characteristics of culture that is important to KM is collaboration, where through that the activity of knowledge sharing among employees in a team can be performed. Trust is also an important indicator in the culture, where the lack of trust can lead to employees' skeptical behavior in sharing their knowledge, which makes everyone will keep their knowledge to themselves [15].

The technological and infrastructural factor facilitates fast search and access to information, cooperation, and also communication among organizational members in the application of KM [13]. IT systems enable employees to find, access, and share knowledge, support communications and speed up connection. Infrastructure must be able to support expert connections and create areas that can be easily used to seek further knowledge in the company [15].

The human resources factor has an important role in seeking hidden knowledge possessed by every individual in the organization [12]. Training programs can be one of the forms of KM applications which play a role in helping employees improve their

competence and skill [16]. Teamwork in the form of studying groups may boost employees' active participations in knowledge sharing [15].

2.3. IT Project Management Critical Success Factors (CSFs)

CSF is something that must be done right by the organization – it can be in the form of a system, program, project, or process – if the organization want to reach a goal, mission, or a specific target [17]. There are two criteria of a successful IT project, which is completion and satisfaction. Completion covers contractual aspects, such as cost, time, and scope. Satisfaction, in the other hand, covers functions (relevance to the goal), quality and operation (ease of usage, ease of learning, ease of maintenance, *etc.*) [18].

A general model is developed from past research which is combined with experience, by dividing success criteria into two dimensions of IT project success. A CSF model of an IT project is made as follows [19]:

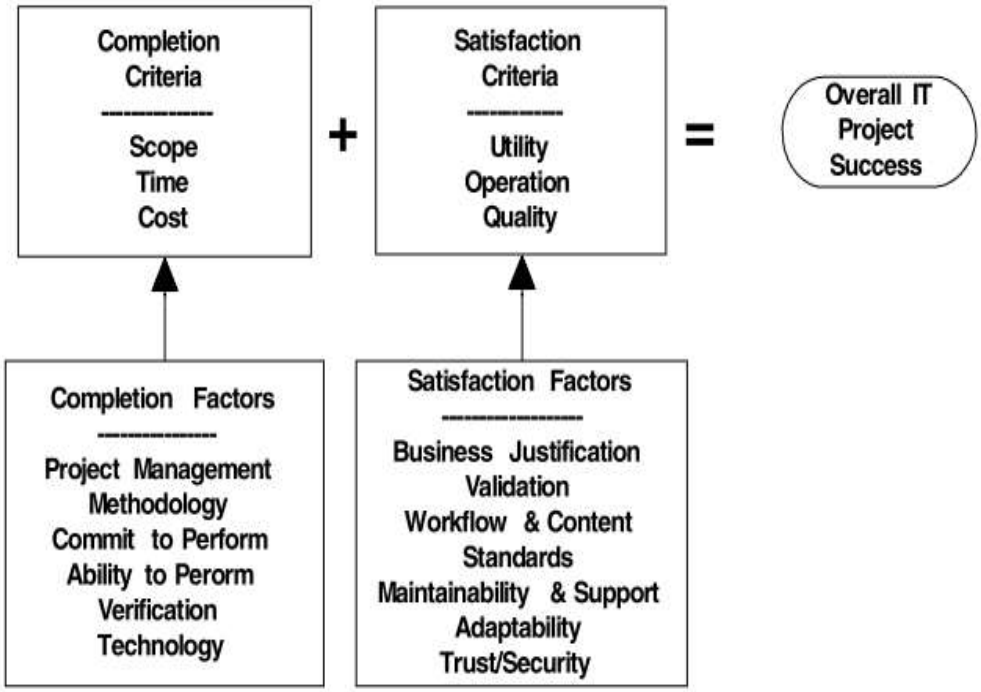

Figure 1. IT Project Management CSFs

3. Methodology

3.1. Proposed Theoretical Framework and Hypothesis

After taking KM theories explained before into consideration, four KM enablers are obtained for further research. They are strategy and leadership, culture, technology and infrastructure, and human resources. From that relationship, a theoretical framework is obtained as follows:

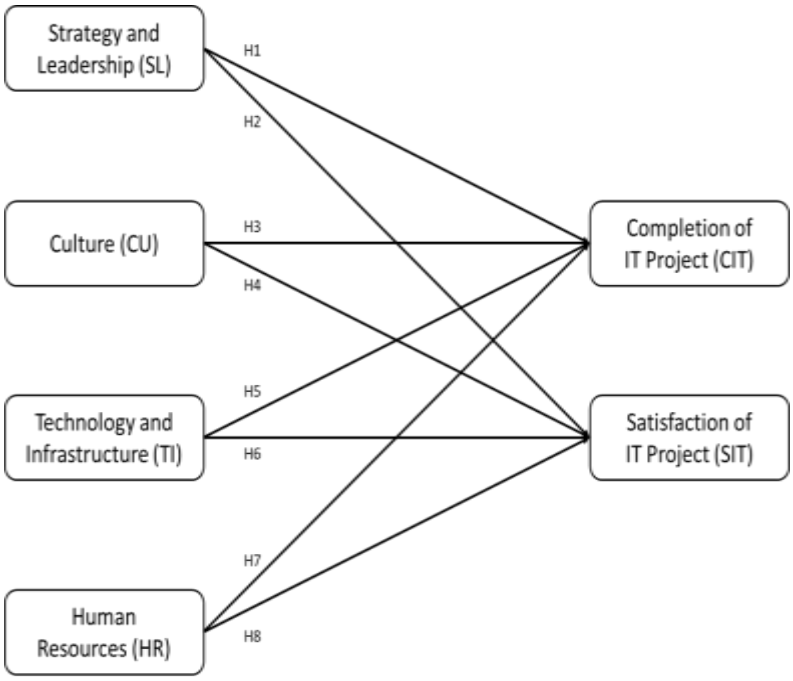

Figure 2. Theoretical Framework

3.2. Population and Data Collection

A survey is done to collect every research data, with the use of questionnaires. The questionnaires are given to all IT Department employees in one of the IT companies in Jakarta. From the given questionnaires, 125 responses are obtained to be analyzed in the research.

4. Result and Discussion

4.1. Outer Model Evalution

The Outer model evaluation is done by testing the validity and reliability of the studied constructs. In this research, every statistical test is done with the Partial Least Square (PLS) approach using the SmartPLS v.3.2.7 software. Below are the results of the validity and reliability tests of the studied constructs:

Table 1. Cross Loading

	CU	SIT	CIT	SL	HR	TI
CU1	**0.796**	0.485	0.406	0.434	0.645	0.313
CU2	**0.780**	0.619	0.605	0.628	0.426	0.491
CU3	**0.864**	0.542	0.458	0.503	0.653	0.309
CU4	**0.727**	0.624	0.583	0.621	0.397	0.326
CU5	**0.849**	0.554	0.439	0.507	0.830	0.377
SIT1	0.470	**0.719**	0.513	0.625	0.376	0.442
SIT2	0.685	**0.867**	0.645	0.773	0.509	0.558
SIT3	0.605	**0.843**	0.592	0.729	0.443	0.446
SIT4	0.620	**0.783**	0.586	0.614	0.410	0.435
SIT5	0.500	**0.763**	0.527	0.569	0.347	0.402
SIT6	0.428	**0.714**	0.511	0.531	0.304	0.447
SIT7	0.588	**0.813**	0.623	0.687	0.441	0.546

CIT1	0.465	0.468	**0.816**	0.519	0.295	0.289
CIT2	0.542	0.606	**0.849**	0.554	0.294	0.346
CIT3	0.482	0.561	**0.725**	0.600	0.304	0.477
CIT4	0.590	0.695	**0.921**	0.655	0.350	0.462
CIT6	0.515	0.630	**0.784**	0.617	0.387	0.467
SL1	0.690	0.832	0.749	**0.878**	0.512	0.623
SL2	0.496	0.580	0.582	**0.738**	0.312	0.441
SL3	0.488	0.581	0.454	**0.792**	0.341	0.417
SL4	0.524	0.664	0.515	**0.852**	0.372	0.434
HR1	0.692	0.540	0.380	0.465	**0.952**	0.340
HR2	0.660	0.438	0.370	0.444	**0.846**	0.252
HR3	0.583	0.414	0.325	0.390	**0.903**	0.332
TI1	0.365	0.482	0.405	0.485	0.284	**0.926**
TI2	0.439	0.571	0.472	0.567	0.327	**0.908**
TI3	0.358	0.474	0.437	0.445	0.234	**0.759**
TI4	0.439	0.535	0.419	0.560	0.351	**0.815**
TI5	0.403	0.537	0.460	0.552	0.295	**0.955**

Table 2. AVE and Root of AVE

Construct	Average Variance Extracted (AVE)	Root of Average Variance Extracted (AVE)
Strategy and Leadership (SL)	**0.667**	**0.816**
Culture (CU)	**0.647**	**0.804**
Teknologi and Infrastructure (TI)	**0.767**	**0.875**
Human Resource (HR)	**0.812**	**0.901**
Completion of IT Project (CIT)	**0.675**	**0.821**
Satisfaction of IT Project (SIT)	**0.621**	**0.788**

Table 3. Latent Variable Correlation

	CU	SIT	CIT	SL	HR	TI
CU	1.000					
SIT	0.714	1.000				
CIT	0.635	0.728	1.000			
SL	0.685	0.769	0.721	1.000		
HR	0.719	0.520	0.399	0.483	1.000	
TI	0.460	0.597	0.503	0.599	0.342	1.000

From the Cross Loading, AVE and root of AVE, and latent variable correlation values, it can be determined that every indicator in each of the constructs is valid and can be tested in the next analytical phase, which is the reliability test. Below are the results of the reliability test:

Table 4. Realibility Testing

Construct	Cronbach's Alpha	rho_A	Composite Reliability
Strategy and Leadership (SL)	0.833	0.860	0.889
Culture (CU)	0.864	0.865	0.901
Technology and Infrastructure (TI)	0.922	0.925	0.942
Human Resource (HR)	0.883	0.897	0.928
Completion of IT Project (CIT)	0.878	0.883	0.912
Satisfaction of IT Project (SIT)	0.897	0.906	0.919

By looking at the produced values of Cronbach's Alpha and Composite Reliability, it can be determined that every indicator in each of the constructs is also reliable and can be tested in the next analytical phase.

4.2. Inner Model Evalution

The Inner model evaluation's goal is to know the causality relationship among latent variables. The structural model can be determined by calculating R-Square values in the endogenous constructs which can be explained by the exogenous variables. In the PLS approach, evaluation of the structural model is done by examining R-Square values for every bound latent variable. The R-Square values estimated by using the SmartPLS software can be seen below (in Figure 3 and Table 5):

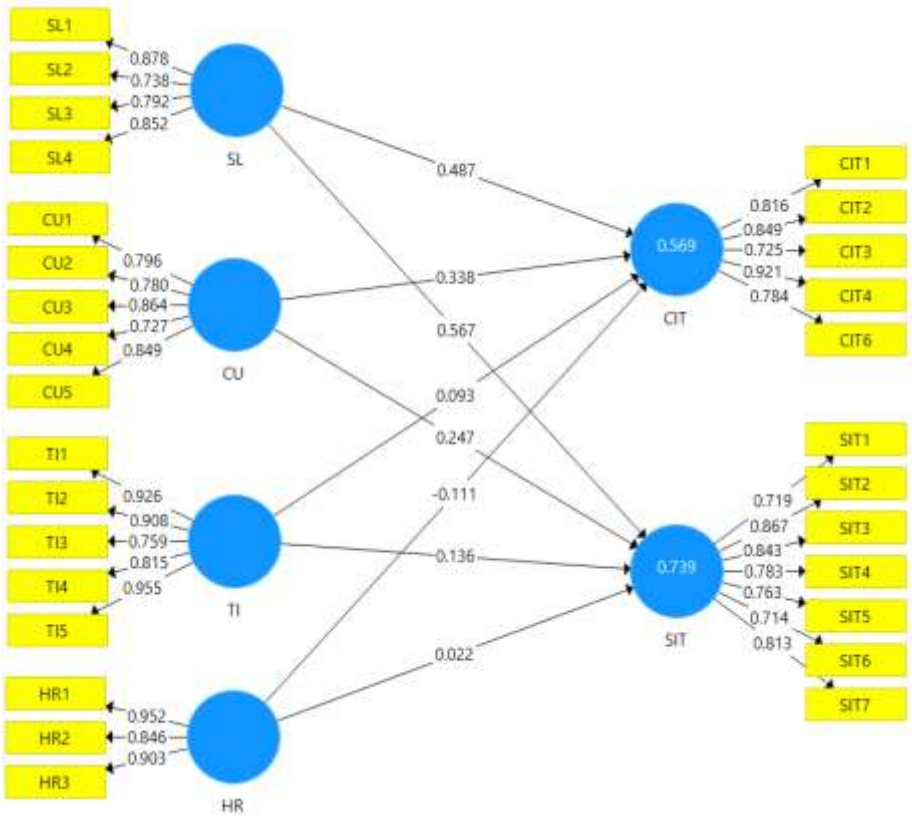

Figure 3. Path Diagram

Table 5. Structural R-Square Model

	R-Square	*R-Square Adjusted*
Completion of IT Project (CIT)	**0.569**	**0.555**
Satisfaction of IT Project (SIT)	**0.739**	**0.731**

From these results, it can be known that this research has a quite good model by looking at the impact of the endogenous constructs to the studied exogenous constructs, which is huge. Because of that, the model can be used in the next phase (hypothesis testing).

4.3. Hypothesis Testing

After testing the conformity of the measurement model, hypothesis testing will be done to the coefficient of the path that connects the latent variable to the inner model. This is done to find out the influence significance of every bound latent variable and also to test every proposed hypothesis. The decision-making basis which is used in testing the hypotheses are through output path coefficients. The hypothesis testing is done by comparing the p-values to the value α (the fault tolerance limit), which is set to 5% or 0.05 in this research. If the p-values produced are smaller than or same as α, then it can be concluded that their relationship is significant. These p-values in the output path coefficients can be seen in Table 6 below:

Table 6. Hypothesis Testing

	Hypothesis	*Original Sample* (O)	*Standard Deviation* (STDEV)	*T Statistics* (|O/STDEV|)	*P-Values*
SL → CIT	H1	0.487	0.098	4.978	**0.000**
SL → SIT	H2	0.567	0.078	7.269	**0.000**
CU → CIT	H3	0.338	0.106	3.198	**0.001**
CU → SIT	H4	0.247	0.086	2.892	**0.004**
TI → CIT	H5	0.093	0.079	1.185	0.236
TI → SIT	H6	0.136	0.068	1.993	**0.047**
HR → CIT	H7	-0.111	0.089	1.244	0.214
HR → SIT	H8	0.022	0.080	0.276	0.782

4.4. Discussion

Based on Table 6, it can be known that there are several significant relationships, which are as follows:

1) Strategy and leadership to completion of IT project, where the p-value is 0.000 (less then α = 0.05).
2) Strategy and leadership to satisfaction of IT project, where the p-value is 0.000 (less than α = 0.05).
3) Culture to completion of IT project, where the p-value is 0.001 (less than α = 0.05).
4) Culture to satisfaction of IT project, where the p-value is 0.004 (less than α = 0.05).
5) Technology and infrastructure to satisfaction of IT project, where the p-value is 0.047 (less than α = 0.05).

From the strategy and leadership factor, this research's findings support the previous research where the support of top management through the project manager in the utilization of KM has a positive effect in the project management itself [20]. The utilization of KM through best practices, project artifacts, lessons learned, also document

and content management may reduce the project cost. Besides that, the process of reusing existing projects and project artifacts may also reduce the time needed to complete the project and reduce the miscommunications that may occur in the project. Lessons learned and best practices may also help in creating projects that exceeds users' expectations, which will increase their satisfaction level.

From the cultural factor, this research's findings support the previous research where the culture of knowledge sharing among employees and the presence of collaborative work in the team may increase project success [21]. The openness of the leader to his employees is considered a culture to be developed. Culture doesn't affect project success directly, but on the other hand helps in shaping every employees' behavior and values which can make their work system better [22].

From the technological and infrastructural factor, this research's findings show a negative effect between this factor and completion of IT project. This contradicts the previous research in managing project knowledge [21]. A good IT system can support in project knowledge management success. Knowledge Management System (KMS) in the company is considered not fully helpful in IT project management. This may be caused by the difficulties in utilizing the system in searching and storing information, which can be used to improve IT project completion. This is different from the satisfaction aspect, which can be reached because all the users' needs and desires to the IT project can be known from the stored knowledge that can be accessed via KMS. The reutilization of stored knowledge may increase project satisfaction because the experience and learning of similar projects in the past is stored.

From the human resources factor, this research's findings also show a negative effect between this factor and IT project completion and satisfaction. This also contradicts the previous research. Training programs can improve the ability and competence of every employee in project completion [21]. The presence of studying groups in the organization may help KM to run better so that employees' active participations in knowledge sharing can be increased [15]. From that result, it can be said that training programs conducted didn't affect IT project completion and satisfaction, where it was found that the training programs given to the employees didn't match with the IT projects they do. It was also found that there were no studying groups in the organization, which causes the employees' active participations in knowledge sharing to decrease.

5. Conclusion

From the analysis and explanation in the previous chapter about the measurement of KM Enabler factors in form of strategy and leadership, culture, technology and infrastructure, and human resources to the completion and satisfaction of IT project management, some conclusions can be drawn as follows:

1) From the result of the test using the PLS approach with the aid of SmartPLS software, there are several significant relationships, which are as follows:

- The relationship between strategy and leadership and completion of IT project, with p-value of 0.000, can infer that strategy and leadership has a positive effect to completion of IT project.
- The relationship between strategy and leadership and satisfaction of IT project, with p-value of 0.000, can infer that strategy and leadership has a positive effect to satisfaction of IT project.
- The relationship between culture and completion of IT project, with p-value of 0.001, can infer that culture has a positive effect to completion of IT project.
- The relationhip between culture and satisfaction of IT project, with p-value of 0.004, can infer that culture has a positive effect to satisfaction of IT project.

- The relationship between technology and infrastructure and satisfaction of IT project, with p-value of 0.047, can infer that technology and infrastructure has a positive effect to satisfaction of IT project.

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