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Impact of Economic and Financial, Construction Technology and Resources, and Project Organizational Culture on Project Performance Studies at PT. PLN UPP Kiting, Centre Part Borneo-1

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ABSTRACT

Project construction is a dynamic and complex system that involves many parties from the planning stage to the project handover stage. The problems that arise are varied and generally vary from one project to another, but these problems affect project performance. Project performance is assessed from the time of project execution, the quality or quality of the project and the costs used in the construction project. Problems that arise in a project often lead to an extension of the project implementation time, additional project costs and work results that do not match the quality of the agreement. This study aims to determine the influence of the internal and external environment on project performance, especially the electricity system development project in Borneo. Internal and external environmental factors are taken from related studies as well as previous research that has been carried out in various countries and regions. It can be concluded that economic and financial factors (X1), technology factors and construction resources (X2) and project organizational culture factors (X3) are the factors causing project performance problems (Y).

1. Introduction

Economic development contributes greatly to the development of a country and the construction industry can improve both things (Ismail et al., 2013). The success of the project is achieved by the cooperation of all project participants, through various stages of work, different phases and processes between each project, as well as input from the two sectors, namely the government and the private sector (Takim & Akintoye, 2002). The project is a unique thing because it varies from one project location to another, because various project environmental factors require adjustments depending on the situation and conditions at that location. Starting from pre-contract activities, construction period to post-contract, the project

involves many parties making it a complex and dynamic system, so that problems often occur that affect project performance (Ngoh et al., 2011).

Dimensions for measuring project performance are the dimensions of time, cost and quality (Enshassi et al., 2009). According to Enshassi, poor project performance can lead to project failure. Many critical factors can lead to project failure, as well as many projects that have poor performance in terms of time performance, cost performance and quality performance. So it is concluded that the success of the performance is the key to the success of the project.

Good project performance is the desire of all project participants in completing the project, both from the owner and the contractor working on the



project. Good project performance will increase the progress of project completion. Completion of the project on time is the desire of both parties. The owner will benefit when the project has been completed and operating. The contractor will also benefit from compensation for completing the project on time, so that the contractor can get another project.

The State Electricity Company (PT. PLN) in the past 3 years has been intensively working on an electricity system development project on the island of Kalimantan. Apart from the plan to move the capital city of the Republic of Indonesia to Kalimantan, the growing demand for electricity on the island of Kalimantan is also increasing due to industrial and housing growth. PT. PLN is required to prepare sufficient electricity for all of this.

The construction of the electricity system on the island of Kalimantan often experiences delays in its completion, there is a difference between the project completion progress schedule and the reality on the ground. Project delays are detrimental to many parties, from the owner of PT. PLN cannot supply electricity to customers due to delays in project completion and the contractor will be subject to fines in accordance with the initial contract agreement before starting project work. Increased project costs also often occur both during the construction period and at the project completion stage, there is also a frequent decline in project quality which causes less work so that it reduces the quality, quality of the project and the final project budget cost. contractor working on the electricity system construction project on the island of Kalimantan. This study aims to explore the influence of the economic environment, finance, technology and construction resources, as well as the influence of project organizational culture on project performance on electricity system construction projects in South and Central Kalimantan.

2. Literature Review

The ability to carry out duties and meet the company's goals well shows that the performance is good. If the company's goals are met, it indicates

that its performance is successful (Carr, 1993). In assessing the performance of a project, a comparison of work planning with work results is carried out, with reference to the contract agreement between the implementing contractor and the owner (Hartono, 2011). Atkinson (1999) identified three criteria for successful project performance through the Iron Triangle, namely cost, time and project quality as the keys to the success of a project. Completion of construction projects in accordance with planning and contractual agreements related to quality, cost and time is the main goal of a project (J.Ritz, 2018). Project performance measurement parameters are here to make it easier for project managers to control projects to keep them in line with project planning objectives. The following four indicators are; cost performance indicators, time performance indicators, quality performance indicators and K3 performance indicators (Occupational Health and Safety) (Husen, 2009).

A project is considered to have good project performance or success if the project is completed on time, within the budget and specified quality standards (Lester, 2006). Furthermore (Lester, 2006) describes the success criteria of a project, where if these criteria are met then it can be said that the project has been successful and if one of these requirements is not met or does not run as it should then it is certain that the project will end in project failure.

The criteria for a successful project include clear project objectives and summaries that have been approved by the client, good project definitions, good planning and scheduling methods, accurate time control and feedback systems, strict performance monitoring and control systems, and change control procedures. strong, availability of adequate resources, full support from top management, competent project management, strict financial control, comprehensive quality control procedures, motivated and integrated work team, competent design, good contract documentation, internal and external communication good relationship, good client relations, good reporting system to management and clients, and stable politics.



In practice, it can be seen at the project planning stage that a manager has planned and designed various project management processes such as how much the project will cost up to the timeframe required to complete the project. If you want to see the performance of a project, then look at the finances and time of the project, when the costs incurred exceed the planned costs, the performance of the project can be said to be bad, as well as the schedule/time if it exceeds what was planned.

The duration of construction project completion time is important and critical because it is often the benchmark for assessing the performance of a project and the efficiency of a project organization (Chan & Kumaraswamy, 2002). Likewise (Atkinson, 1999; J. Ritz, 2018) revealed that time performance is one of the inseparable criteria for identifying project performance.

A project is required to work to control the schedule and project costs to produce specific and good results (J. Ritz, 2018). Cost performance is part of the main pillar triangle of project performance where a project is considered to have good project performance or success if the project is completed with construction costs in accordance with project cost planning (Atkinson, 1999; Lester, 2006).

Project performance is a form of how the project works by comparing the quality and quality of the actual work with the estimated workings in the work contract that has been agreed upon by the owner and the contractor implementing the construction (Hartono, 2011). One of the project performance indicators, namely quality performance is one of the keys to the success of a project and part of the identifier of project performance criteria (Husen, 2009; J. Ritz, 2018; Lester, 2006).

The economic and financial environment are variables that are commonly used to measure construction project performance. In other words, the economic and financial environment is a concept to assess the economic stability of organizations, regions, countries and globally. In general, there are two factors that affect the project's economic and financial environment, namely the internal

economic environment and the external economic environment (Lester, 2006).

The internal economic environment leads to the economic viability of the project during the construction phase, while the external economy is influences from outside the construction scope that significantly affect the sustainability of the project such as political conditions, currency exchange rates, taxes and materials. To measure the economic and financial environment, there are several economic factors consisting of easy access to capital, unexpected price increases for raw materials and equipment, unexpected price increases for labor, foreign exchange rates and inadequate working capital (Lester, 2003). 2006) (Walker A., 2015).

Construction technology and resources are part of the strategic plan that must be developed for smooth project performance. During the construction phase, construction technology and resources play an important role in ensuring the sustainability of a project. Projects that have modern construction technology and sufficient resources will not experience delays in project completion. The construction technology and resource factors consist of five indicators including labor shortages, shortages of equipment or raw material suppliers, imports of materials and materials, strikes by labor unions and delays in the delivery of materials and materials (Lester, 2006).

An organization that is formed to achieve a goal and will be dissolved when that goal has been achieved is the definition of a project organization.

The achievement of goals is the main target of the formation of the project organization, so that the organizational form is dynamically adapted to the project objectives. According to (Erviyanto, 2005), uniting various jobs from several groups in one command and aligning common goals is the definition of project organization.

Pinto (2016) stated that there are several factors of project organizational culture that affect project performance. First, it affects communication between departments and their interdependence to achieve project objectives. Second, culture has an influence on employee commitment to achieving



project goals to the exclusion of group or individual interests. Third, the organizational culture affects pre-construction such as the number of workers plan, the number of heavy equipment plans to the project financial plan. Thus, the project manager's assessment of a group and its work is affected. Thus, when examining the organizational culture dimensions of a construction project, one can argue that a useful source of information is the basic practice experienced by project participants during the project construction process.

So it can be concluded that the project organizational culture is formed through project activities, this is what causes the various forms of project organizational culture. Electricity infrastructure development project activities such as Substations (GI), High Voltage Air Lines (SUTT), and power plants are generally divided into main activities, namely material procurement activities and construction service work activities.

The substation electricity infrastructure development project activities in general are equipment procurement work, electrical and mechanical construction service work (EM) and civil construction service work, with variations in the details of their work activities depending on the type of project, but in general the main activities remain as above be it a substation construction project and a high-voltage overhead line construction project. During a project activity there is a culture of the organization on the project formed so that a project organizational culture is formed, which can be judged from its work achievement, if the work activities are in accordance with the existing schedule, it can be said that the project organizational culture is good but is said to be bad if the achievements are not according to plan or the project is delayed.

Project organizational culture begins with organizational culture, according to (Hofstede, 2001), the collection of some group and individual project participants' thoughts that are united and controlled is the project organizational culture. Meanwhile, according to (Schein, 1992) organizational culture is formed after so long a group

goes through various situations and conditions, finding solutions to various problems that cause the group to adapt from each individual to external challenges with internal coordination, which is continued by cultural transfer. to new individuals who join the group. Meanwhile, according to (Pfister J., 2009) combining definitions from (O'Reilly et al., 1991; Schein, 1992), after a long time a group overcomes problems by finding and developing its own problem-solving method to form norms that regulate individual behavior and group is organizational culture.

3. Methods

The type of research presented in this research is quantitative and is classified as causal research. This study uses a quantitative research method of causality by collecting primary data by distributing questionnaires. This study consists of four variables, namely the independent variable is the economic and financial environment (X1), technology and construction resources (X2), and project organizational culture (X3) while the dependent variable is project performance (Y). This study was conducted at the PT. PLN UPP Kiting Kalbagteng Project in Kalimantan in March 2021. The participants of this study consisted of contractors and owners of the electricity system development project carried out by PLN UPP Kiting Kalbagteng 1 in Kalimantan.

The population in this study were all parties involved in the construction of electricity infrastructure projects under the supervision of PLN UPP Kiting Kalbagteng 1. In this study, the required sampling was using non-probability sampling techniques. The background is due to the relatively small population, which is only 48 contractors and 2 clients from PT. PLN UPP Kiting Kalbagteng 1 in Kalimantan, 48 contractors consisting of 10 main contractors, namely as the winner of the tender for the electricity infrastructure development project.

Data analysis using SPSS 24.0 (IBM) software. There are two outer and inner, tests where the outer test tests the indicators against their constructs by assessing the loading factor and AVE of all objects



in different situations and times. While the test is inner to assess the relationship between constructs.

4. Results and Discussion

Characteristics of research respondents

Based on table 1, the majority of male respondents informed us that the majority of those who work in the construction industry, especially electricity construction in South Kalimantan and

Central Kalimantan are male, because the workload requires full attendance at the construction site. This makes this work more suitable for men than women, besides that all construction workers are also men so that women's interest in being involved in the construction industry is low. This is in accordance with the theory expressed by (Malayu, 2003) that heavy work is not appropriate for women and that the nature of work, working time and labor regulations must pay attention to gender.

Table 1. Characteristics of respondents

Characteristics	Frequency	Percentage
Gender		
Male	40	80
Female	10	20
Age		
25 Years	6	12
26 - 30 Years	28	56
31 - 35 Years	6	12
> 35 Years	10	20
Marital status		
Single	17	34
Married	33	66
Last education		
SMA	5	10
Diploma	22	44
S1	22	44
S2	1	2
Length of work		
1-5 years	19	38
6-10 years	21	42
11-15 old	4	8
>15 years	6	12
Position		
Project manager	8	16
Site manager	24	48
Supervisor	18	36

The majority of respondents are male, informing us that the majority work in the construction industry, especially electricity construction in Kalimantan. The majority of South and Central Kalimantan are men, because the workload that requires full presence at the construction site makes this work more suitable for men than women, in addition to the fact that all construction workers are also men so that women's interest in being involved in the construction industry is low. This is in accordance with the theory expressed by (Malayu, 2003) that heavy work is not appropriate for women and that the nature of work, working time and labor regulations must pay attention to gender.

The majority of respondents aged between 26 years to 30 years, as many as 28 people or (56.00%). So it can be said that the majority of employees who work for companies or electricity infrastructure development contractors in the PT. PLN UPP Kiting Kalbagteng 1 is an employee of productive age. (Robbins & Judge, 2015) revealed that performance achievement is influenced by the number of productive employees, experience, judgment, good work ethic and commitment to quality. Based on table 5.3 shows that the majority of respondents are married as many as 33 people or (66.00%). Someone will be more responsible and think more mature if



they are married, so they are considered to be able to work better.

Based on table 1, the majority of respondents whose last education was diploma and bachelor's degree were 22 people or (44.00%). This is in line with research (Ahmed Soomro et al., 2019) in his research related to project performance in Pakistan where the majority of respondents as much as 80.9% have undergraduate education backgrounds, this means that interest in continuing studies in construction industry employees, especially in electricity infrastructure development projects The working area of South Kalimantan and Central Kalimantan is relatively low due to the workload that requires full attendance at the construction site, making it difficult to allocate time to be able to continue education to a higher level.

Based on table 1 shows that the majority of respondents are respondents whose position is Site Manager, as many as 24 people or (48.00%). This is in line with the phenomenon in the field where project managers are only 1 in the organizational structure of a project and generally a project manager holds more than 1 project location, so the number is less, unlike the case with site managers and supervisors who demand full attendance at the work site. so that if there is another project in a different location, it must recruit new employees for the position, because the current job cannot be abandoned. If forced to be abandoned, there will be a decrease in time performance, quality performance to cost performance which leads to poor project performance, in line with the theory (Malayu, 2003) that the key to obtaining optimal work performance is the placement of the right employees.

Table 2. Descriptive analysis of economic and financial environment variables

No	Statement Items		Respondent's Answer					Total Score	Mean
			5	4	3	2	1		
1	High interest rates or currency exchange rates affect project performance	F	7	23	14	3	3	178	3.56
		%	14.00%	46.00%	28.00%	6.00%	6.00%		
2	Inadequate working capital affects project performance	F	9	13	22	4	2	173	3.46
		%	18.00%	26.00%	44.00%	8.00%	4.00%		
3	Increase in construction material prices affect project performance	F	11	17	11	10	1	177	3.54
		%	22.00%	34.00%	22.00%	20.00%	2.00%		
Total Score and Average							528	3.52	

Based on table 2, it can be seen the average respondents' responses regarding the economic and financial environment variables (X1). It can be seen that the total score is 528, and overall the average respondents' responses regarding the economic and financial environment variables (X1) is 3.52, which is included in the good category. The good category in this case means that respondents' responses to the overall economic and financial environment variables (X1) after being averaged are descriptively that respondents assess that these variables have a

strong influence on project performance and the main indicators or main factors in measuring the economic and financial environment are the inflation rate with the highest mean value among other factors, followed by the increase in material prices and finally the inadequate working capital factor.

Based on the ranking of these factors results in the fact that a high inflation rate causes the price of construction materials to be imported to be high, if the price is too high it can cause a setback in



payments because the company has to revise financial planning or project costs or can even cause

a purchase failure which will have a bad impact. on project performance.

Table 3. Descriptive analysis of technology variables and construction resources

No	Item Statement		Respondent's Answer					Total Score	Mean
			5	4	3	2	1		
1	Lack of skilled workforce affects project performance	F	5	14	25	5	1	167	3.34
		%	10.00%	28.00%	50.00%	10.00%	2.00%		
2	Scarcity of construction materials affects project performance	F	9	13	24	3	1	176	3.52
		%	18.00%	26.00%	48.00%	6.00%	2.00%		
3	Delays in equipment material delivery affect project performance	F	10	19	12	8	1	179	3.58
		%	20.00%	38.00%	24.00%	16.00%	2.00%		
Total Score and Average							522	3.48	

Based on table 3 it can be seen that the average respondent's response to the variable construction technology and resources (X2). It can be seen that the total score is 522, and overall the average respondent's response to the variables of technology and construction resources (X2) is 3.48, which is included in the good category. The categorization of both technology and construction resources variables (X2) descriptively means that the opinion of respondents is that this variable has a strong

influence on project performance, with the main indicator or factor to measure this variable being the delay in equipment delivery with the value mean highest among the factors. another, followed by the material scarcity factor in the second place and the labor shortage factor in the last position. The project organizational culture variable (X3) consists of 17 statement items. The following presents the overall results regarding the Project Organizational Culture variable (X3).



Table 4. Descriptive analysis of project organizational culture variables

No	Statement Items		Respondent's Answer					Total Score	Mean
			5	4	3	2	1		
1	This company has committed to complete the project on time and has been estimated optimistically, favorably and pessimistically	F	4	23	17	4	2	173	3,46
		%	8.00%	46.00 %	34.00%	8.00%	4.00%		
2	The company has committed to make the project successful in terms of estimated contract costs optimistic, favored and pessimistic	F	2	22	19	5	2	167	3,34
		%	4,00%	44 ,00%	38.00%	10.00%	4.00%		
3	This company has committed to make the project successful in terms of quality which has been estimated optimistically, favorably and pessimistically	F	8	16	19	7	0	175	3.50
		%	16.00 %	32.00%	38.00%	14.00%	0.00%		
4	This company provides a clear understanding of the goals and value of the project to all project participants equally	F	17	12	10	9	2	183	3,66
		%	34.00%	24.00%	20.00%	18.00%	4.00%		
5	This company has very clear understanding of the roles and tasks that must be done	F	6	18	16	9	1	169	3,38
		%	12.00%	36.00%	32.00%	18 ,00%	2.00%		
6	The project client has clearly understood his role and obligations towards the contractor and the project	F	11	22	13	3	1	189	3.78
		%	22.00%	44.00%	26.00%	6.00%	2, 00%		
7	All project participants understand each other's goals, expectations and values	F	9	21	12	5	3	178	3.56
		%	18.00%	42.00%	24.00%	10.00%	6.00%		
8	This company has share information transparently and openly to all project participants during the project	F	9	26	12	3	0	191	3.82
		%	18.00%	52.00%	24.00%	6.00%	0.00%		
9	This company guarantees the project manager who provides clear direction and project manager who provides assistance and encouragement to subordinates	F	7	27	11	2	3	183	3.66
		%	14.00%	54.00%	22.00%	4.00%	6.00%		
10	This company cultivates relationships effective work among project workers in finding innovative solutions and reducing project costs and time	F	10	26	10	3	1	191	3.82
		%	20.00%	52.00%	20.00%	6.00%	2.00%		
11	Company views all project participants as important contributors to project success	F	7	20	17	6	0	178	3.56
		%	14.00%	40.00%	34.00%	12.00%	0.00%		
12	This company provides many opportunities for project participants to develop their abilities during the project construction period	F	5	20	20	5	0	175	3.50
		%	10.00%	40.00%	40.00%	10.00%	0.00%		
13	Supervisors have a high commitment to make the project successful and successful	F	8	26	13	3	0	189	3.78
		%	16.00%	52.00%	26.00%	6.00%	0.00%		
14	Strong leadership shown by project leader	F	4	26	14	6	0	178	3.56
		%	8.00%	52.00%	28, 00%	12.00%	0.00%		
15	This company does not provide opportunities for project participants to attend any training sessions, either on skills or safety.	F	4	16	23	6	1	166	3,32
		%	8.00%	32.00%	46.00%	12.00%	2.00%		
16	This company does not pay much attention to respect for project workers	F	3	18	22	5	2	165	3, 30
		%	6.00%	36.00%	44.00%	10.00%	4.00%		
17	This company does not care about the health and welfare of project workers	F	2	22	19	5	2	167	3,34
		%	4.00%	44, 00%	38.00%	10.00%	4.00%		
18	This company has carefully estimated the project completion time by forming an estimator team that considers the estimated time mode based on optimistic time, preferred time and pessimistic time	F	4	18	21	7	0	169	3.38
		%	8.00%	36.00%	42.00%	14.00%	0.00%		
19	This company has carefully estimated the total cost of the project construction by forming an estimator team that considers themode estimated cost based on the cost total optimistic, most preferred total cost and pessimistic total cost	F	8	23	14	5	0	184	3.68
		%	16.00%	46.00%	28.00%	10.00%	0.00%		
Total Score and Average							3370	3.55	



Based on In table 4, it can be seen that the average respondents' responses regarding the Project Organizational Culture variable (X3). Can know the total score value that is equal to 3370, and an overall average of respondents on variables Organizational Culture Project(X3)that is equal to 3.55 are included in both categories. The good categorization of the Project Organizational Culture (X3) variable descriptively means that the respondent's opinion is that this variable has a strong influence on project performance, with the main indicator or factor to measure this variable being the information exchange factor and the interdependence factor with the highest mean value

among the factors. other factors and are included in the goal alignment dimension. The goal alignment dimension is also the main dimension to measure project organizational culture with the highest mean value among other dimensions, followed by the meticulous culture dimension in the second, then the contractor commitment dimension in the third and finally the worker orientation dimension in the last position.

The project performance variable (Y) consists of 9 statement items. The following presents the overall results regarding the project performance variable (Y) (table 5).

Table 5. Descriptive analysis of project performance variables (Y)

No	Statement Items		Respondent's Answer					Total Score	Mean
			5	4	3	2	1		
1	There was an extension of the implementation time from the planned	F	10	21	11	7	1	182	3.64
		%	20.00%	42.00%	22.00%	14.00%	2.00%		
2	There was an extension of implementation time due to additional work and rework/redesign	F	5	22	17	5	1	175	3.50
		%	10.00%	44.00%	34.00%	10.00%	2.00%		
3	Procurement of resources labor, materials, equipment that are not in accordance with the project planning/inefficient causing work delays	F	15	16	10	8	1	186	3,72
		%	30.00%	32.00%	20.00%	16.00%	2.00%		
4	The total contract value has changed due to a Contract Addendum	F	13	16	15	2	4	182	3.64
		%	26.00%	32.00%	30.00%	4.00%	8.00%		
5	Estimated project costs exceed actual costs	F	5	23	14	7	1	174	3,48
		%	10.00%	46.00%	28.00%	14.00%	2.00%		
6	The occurrence of cost overruns due to additional work and rework/redesign	F	13	17	10	9	1	182	3, 64
		%	26.00%	34.00%	20.00%	18.00%	2.00%		
7	The occurrence of a decrease in the quality of the product generated	F	7	23	13	5	2	178	3.56
		%	14.00%	46.00%	26.00%	10.00%	4.00%		
8	The occurrence of rework and dismantling of work items that have been done	F	8	31	6	4	1	191	3,82
		%	16.00%	62.00%	12.00%	8.00%	2.00%		
9	There is a defect in the product that is not in accordance with the technical specifications	F	6	26	12	4	2	180	3.60
		%	12.00%	52.00%	24.00%	8.00%	4.00%		
Total Score and Average							1630	3.62	



Based on table 5 it can be seen that the average respondents' responses regarding the Project Performance variable (Y). It can be seen that the total score is 1630, and overall the average respondent's response to the Project Performance variable (Y) is 3.62, including in the good category. The good categorization of the Project Performance variable (Y) descriptively means that the respondents' opinions on the indicators used as measuring tools to measure these variables are quite strong, with the main factors to measure this variable being the factors rework and demolition with the highest mean value among other factors and included in the quality performance indicators. Quality performance indicators are also the main indicators for measuring project performance with the highest mean value among other indicators, followed by time performance indicators in second place, then cost performance indicators in third.

5. Conclusion

Based on the results of the research that has been done, it can be seen that the conclusions of the study are as follows:

The economic and financial environment has a significant positive effect on project performance, with the increase in material prices as the main factor of the economic and financial environment.

Technology and construction resources have a positive but not significant effect on project performance, because the scarcity of materials as the main factor of this variable is an easy thing to solve in this free market era.

Project organizational culture has a significant positive effect on project performance, with the alignment of project objectives to all project participants is a major factor in the success of the project organizational culture

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[92](#)

