Analysis of Balanced Scorecard Implementation on the Calculation of Performance of PT PLN (Persero) North Sumatera

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Abstract. This research aims to analyze the results of the balanced scorecard implemented by PLN UIKSBU in optimizing the achievement of its targets. The hypothesis was formulated that the measurement of key performance indicators from the perspective of human resources, namely Human Capital Readiness (HCR) and Organization Capital readiness (OCR), as a program to improve employee competence and organizational maturity, which is moderated by Information Capital Readiness (ICR) as a program to improve information and technology management that will have a positive effect on the Equivalent Forced Outage Rate (EFOR) as a key performance indicator on the perspective of products and processes to measure the level of operational reliability of the generating unit. The condition found is a phenomenon that the implementation of a Balanced scorecard has not been able to optimize the achievement of PLN UIKSBU performance targets and even tends to decline. Data collection was carried out through surveys using questionnaires. The survey was conducted on all 241 structural employees in PLN UIKSBU. Furthermore, the survey data was processed using the SPSS application with the following results; (1) Partially Human Capital Readiness (HCR) has a positive and significant effect, Organization Capital readiness (OCR) has a negative and insignificant effect, Information Capital Readiness (ICR) has a positive and insignificant effect, and Human Capital Readiness (HCR) and Organization Capital readiness (OCR) moderated Information Capital Readiness (ICR) has an insignificant negative effect on the Equivalent Forced Outage Rate (EFOR); (2) Simultaneously Human Capital Readiness (HCR), Organization Capital readiness (OCR), Information Capital Readiness (ICR), and Human Capital Readiness (HCR) and Organization Capital readiness (OCR) moderated by Information Capital Readiness (ICR) has a positive and significant effect on EFOR; (3) Determination coefficient of $R2 = 0.102$. From the results of this study, it is suggested that PLN UIKSBU can review the implementation of the Organization Capital readiness (OCR) and Information Capital Readiness (ICR) programs, with a relatively small coefficient of determination, the next suggestion is to do research on other factors that affect the Equivalent Forced Outage Rate (EFOR).

Keywords: performance · human capital readiness · organization capital readiness · information capital readiness · equivalent forced outage rate

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1 Introduction

PLN UIKSBU is under PT. PLN (Persero) runs the power plant management business, including operations and maintenance. In carrying out this task, PLN UIKSBU was given an annual performance target in a management contract consisting of 20 Key Performance Indicators (KPIs) grouped into 4 perspectives, as seen in Fig. 1. This management contract is a performance measurement method that uses balanced scorecard rules. Balanced scorecard (BSC) is an alternative method used to measure a company's performance more comprehensively, not only limited to financial [1]. The implementation of the Balanced Scorecard through the process of identifying a hypothetical sequence of the causal relationship between perspectives is described as the flow of business performance from a lower to a higher level in or between perspectives [2]. The phenomenon that occurs indicates that the implementation of the Balanced scorecard does not provide e a positive impact on improving performance. From 2015 to 2019, the realization of PLN UIKSBU's performance did not increase and even tended to decrease.

NO	KEY PERFORMANCE INDICATOR		UNIT	WEIGHT
I	Product and Process Perspective			
1	EFOR	↓	%	14
2	SOF	↓	%	8
3	Heat rate	↓	kcal/ kWh	10
4	EAF	↑	%	18
5	Electricity Consumption	↑	%	5
II	Human Resource Perspective			
1	Human Capital Readiness (HCR)	↑	Level	2
2	Organization Capital Readiness (OCR)	↑	Level	3
3	Employee Productivity	↑	MWh/Employee	2
III	Finance And Market Perspective			
1	Cost of Generation	↓	Rp/kWh	4
2	Investment	↑	Rp	6
3	Inventory Turnover	↑	Day or Time	6
IV	Leadership Perspective			
1	Corporate Social Responsibility	↑	Skor	3
2	Malcolm Baldrige Improvement	↑	%	3
3	Enterprise Risk Management	↑	Level	3
4	Job Security implementation	↑	%	3
5	Completion of audit findings	↑	%	3
6	Environmental Management level	↑	Unit	3
7	X-men For Expert implementation	↑	Unit	2
8	Commmunication Management	↑	Unit	2

Fig. 1. PLN UIKSBU management contract

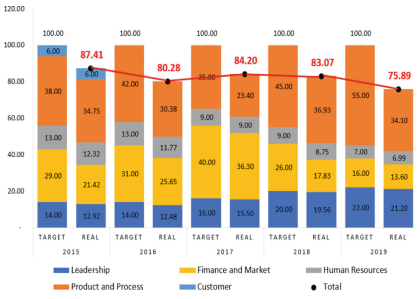

Fig. 2. Performance perspective

Figure 2 shows the comparison of targets and the realization of annual performance for each perspective, in the perspective of human resources. The gap that occurs is minimal, meaning that it can always optimize performance achievement according to the target. While from the perspective of products and processes, there is always the most significant gap that causes PLN UIKSBU performance targets not to be achieved. Figure 3 shows the comparison of targets and the realization of the performance of each KPI from the perspective of products and processes; the largest difference occurred in the KPI EFOR.

Figure 4 shows the comparison of targets and the realization of the performance of each KPI from the perspective of human resources, where there is no significant difference in all KPIs.

Figure 5 is a conceptual framework of research that aims to see the causal relationship between the human resource perspective and the product and process perspective by measuring the effect of HCR, OCR, and ICR on EFOR.

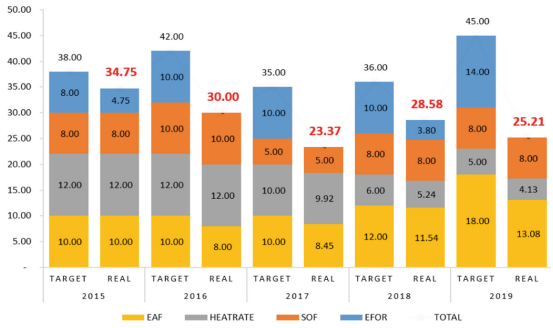

Fig. 3. Products and processes perspective

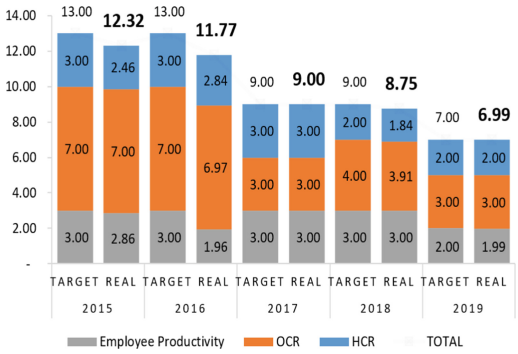

Fig. 4. Human resources perspective

Fig. 5. Conceptual framework

2 Research Methods

The type of research used is causal research to look at the causal relationship between the variables studied [3]. The research location was carried out in the parent unit and all implementing units of PT PLN UIKSBU. The sample determination method used in this study was a saturated sample or census method where data collection was carried out on all structural employees in PLN UIKSBU, both in the parent unit and the implementation unit. This technique was based on the reasons for the need for data and information from management implementers with comprehensive understanding of capital related to the company's management contracts.

2.1 Data Collection Methods

Data collection was done by sharing a questionnaire consisting of 22 statements using a 5-point Likert scale to see the response and the employees' understanding of implementing balanced scorecards on performance.

2.2 Data Analysis Method

Data analysis method used in this study was descriptive analysis and moderation test with absolute difference value [4].

3 Results and Discussion

3.1 Instrument Test Method

3.1.1 Validity Test

After testing the questionnaire validity of the HCR, OCR, ICR, and EFOR, the results show that all question items have an r value > 0.273 [4], so it can be concluded that all item questions are valid.

Table 1. Coefficient regression

	Unstandardized Coeff.		Std. Coeff.		
	B	Std. Error	B	T	Sig.
1 (Constant)	14.079	0.203		69.468	0.000
Zscore Human Capital Readiness	0.498	0.12	0.3	4.144	0.000
Zscore Organization Capital Readiness	−0.531	0.142	−0.32	−3.736	0.000
Zscore Information Capital Readiness	0.071	0.152	0.043	0.471	0.638
abax1_x	−0.1	0.146	0.047	−0.682	0.496
absx2	−0.265	0.204	−0.091	−1.297	0.196

3.1.2 Reliability Test

After testing the variable reliability of the HCR, OCR, ICR, and EFOR, the results show that all variables have a Cronbach's Alpha value > 0.70 [4], so it can be concluded that all item questions are reliable.

3.2 Data Analysis Method

3.2.1 Moderated Regression Analysis (MRA)

Based on Table 1, the results obtained from the multiple linear regression equations shows in Eq. (1).

$$\begin{aligned} Y = {} & 14.079 + 0.498X1 - 0.531ZcX2 + 0.071ZcZ - 0.100 \\ & |ABSX1\text{-}Z\ | - 0.265|ABSX2\text{-}Z| \end{aligned} \tag{1}$$

3.2.2 Descriptive Analysis

The constant value of 14.079 indicates that the variable HCR, OCR, HCR interaction with ICR, and OCR interaction with ICR are considered constant at the EFOR variable. If the value of an independent variable is worth 0 or constant, the EFOR has a value of 14.079 units.

The regression coefficient value of HCR = 0.498 > 0, indicates that the HCR variable has a positive effect on the EFOR, meaning that the higher the HCR, the EFOR will increase, and vice versa.

The regression coefficient value of the OCR = −0.531 < 0, indicates that the OCR variable has a negative effect on the EFOR, meaning that the higher the OCR, the EFOR will decrease, and vice versa.

The regression coefficient value of ICR = 0.071 > 0, shows that the ICR variable has a positive effect on the EFOR, meaning that the higher the ICR, the EFOR will increase, and vice versa.

Table 2. One Sample Kolmogorov

N		214
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1.55511204
Most Extreme Differences	Absolute	.054
	Positive	.054
	Negative	−.051
Test Statistic		.054
Asymp. Sig. (2-tailed)		.200[c,d]

The regression coefficient value of the absolute difference interaction between HCR and ICR $= -0.100 < 0$, indicates that the interaction of absolute difference between HCR and ICR has a negative effect on the EFOR.

The regression coefficient value of the absolute difference interaction between OCR and ICR $= -0.265 < 0$, indicates that the interaction of the absolute difference between OCR and ICR has a negative effect on the EFOR.

3.3 Classic Assumption Test Method

3.3.1 Normality Test

Table 2 shows that the probability value or Asympt. Sig. (2-tailed) is $0.200 > \alpha$ (0.05) [4], thus residual variables are distributed normally.

3.3.2 Multicollinearity Test

Based on Table 3, it can be seen that the Tolerance value of the variables HCR, OCR, ICR, HCR interaction with ICR, and OCR interaction with ICR > 0.1 and VIF value $<$ 10 [4]. This shows that there is no multicollinearity problem between free variables in the regression model.

3.3.3 Heteroscedasticity Test

From the Glejser test of Table 4, the value of Sig is known. Glejser on HCR $0.540 > \alpha$ (0.05), OCR $0.249 > \alpha$ (0.05), ICR $0.825 > \alpha$ (0.05), HCR interaction with ICR $0.095 > \alpha$ (0.05), and OCR interaction with ICR $0.698 > \alpha$ (0.05), this indicates no symptoms of heteroskedasticity.

Table 3. Collinearity Statistics

Model	Unstd. Coefficients		Collinearity Stat.	
	B	Std. Error	Tolerance	VIF
1 (Constant)	14.079	.203		
Zscore: Human Capital Readiness	.498	.120	.804	1.243
Zscore: Organization Capital Readiness	−.531	.142	.576	1.737
(Constant)	1.209	.110		11.000
Zscore: Human Capital Readiness	.040	.065	.047	.614
Zscore: Information Capital Readiness	.071	.152	.506	1.975
absx1_z	−.100	.146	.897	1.115
absx2 z	−.265	.204	.858	1.166

Table 4. Glejser Test

	Unstandardized Coeff.		Std. Coeff.	t	Sig.
	B	S	B		
Zscore: Human Capital Readiness	.040	.065	.047	.614	.540
Zscore: Organization Capital Readiness	.089	.077	.104	1.155	.249
Zscore: Information Capital Readiness	.018	.082	.021	.222	0.825
absx1 z	.133	.079	.121	1.677	.095
absx2 z	−.043	.111	−.029	−.388	.698

Table 5. Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.350[a]	.123	.102	1.574

3.4 Coefficient of Determination (R^2)

Based on Table 5, it is known that the value of the coefficient of determination (Adjusted R-Squared) is 0.102 or 10.2%. This shows that the 10.2% variation in the EFOR can be explained by free variables, namely HCR, OCR, ICR, HCR interaction with ICR, and OCR interaction with ICR, and the remaining 89.8% was explained by other factors outside the study model.

Table 6. F-Test

Model		Sum of Squares	df	Square	F	Sig.
1	Regression	72.139	5	14.428	5.826	.000[b]
	Residual	515.114	208	2.477		
	Total	587.252	213			

3.5 Hypothesis Testing Method

3.5.1 Simultaneous Test (F-Test)

In Table 6, the number of samples (n) is known as many as 214 respondents and the number of parameters (k) as much as 6, so that df1 = 6 − 1 = 5; df2 = n − k = 214 − 6 = 208, then at the α = 0.05 Ftable = 2,257. The values Fcount (5,826) > Ftable (2,257) and significance (0.000) < α (0.05).

This means variables HCR, OCR, ICR, HCR interaction with ICR, and OCR interaction with ICR simultaneously have a positive and significant effect on EFOR. The results of this study are supported by research by Adil Zahoor and Musadiq Amin Sahaf [5], which stated that employee learning and growth have a positive effect on internal business processes, which in turn affect the customer perspective.

3.5.2 Partial Test (T-Test)

With (n) = 214, the number of parameters (k) = 6, df = (n – k) = 214 – 6 = 208 then at the error rate α = 0.05, obtained t_{table} = 1.971. According to Table 7, the regression coefficient values of HCR = 0.498 > 0, with t_{count} (4,144) > t_{table} (1.971) and significance (0.000) < α (0.05). This indicates that the HCR variable has a positive and significant effect on the EFOR. The results of this study are supported by previous research by Tjahjadi, Soewarno, & Viviani [6] which showed that HCR has a direct and positive effect on business performance and M. Harris, McMahan, & Wright [7] which stated a positive influence relationship between HCR and performance.

The regression coefficient values of the OCR = −0.531 < 0 with t_{count} (−3,736) < t_{table} (−1.971) and significance (0.000) < α (0.05). This indicates that the OCR variable has a negative and significant effect on the EFOR.

The results of this study are supported by previous research by Hailin Zhao, Haimeng Teng and Qiang Wu [8] which stated that the promotion of corporate culture is negatively related to the company's market value and is not significantly related to the company's financial performance.

Muhammad Asrar-Ul-Haq, k. Peter Kuchinke [9] stated that the laissez-faire leadership style shows a negative relationship with employee performance outcomes in terms of effectiveness, and employee satisfaction.

Yuliansyah, Johnny Jermias [10] revealed no mediating relationship between strategic service alignment and organizational learning with performance measurement systems and performance outcomes.

Table 7. T-Test

	Unstandardized Coeff.		Std. Coeff.	t	Sig.
	B	Std. Error	B		
1 (Constant)	14.079	.203		69.468	.000
Zscore: Human Capital Readiness	.498	.120	.300	4.144	.000
Zscore: Organization Capital Readiness	−.531	.142	−.320	−3.736	.000
Zscore: Information Capital Readiness	.071	.152	.043	.471	.638
absx1_z	−.100	.146	−.047	−.682	.496
absx2 z	−.265	.204	−.091	−1.297	.196

David Staniforth [11] revealed that if the overall assessment is composed of a complete set of teamwork outcomes, many of the commonly reported benefits may not exist.

The regression coefficient values of Information Capital Readiness ($\beta 3$) = 0.071 > 0, with t_{count} (0.471) < t_{table} (1.971) and significance (0.638) > α (0.05), this indicates that the ICR variable has a positive and insignificant effect on the EFOR. The results of this study are supported by the research of Chen Jeng Huang and Chun Ju Liu [12] which stated that Information Technology (IT) capital does not have a significant impact on company performance.

A.H.G.M Spithoven [13] revealed that the overall level of productivity does not reflect increased investment in information technology and computers.

The regression coefficient value of the interaction of the absolute difference of HCR with ICR = −0.100 < 0 with t_{count} (−0.682) > t_{table} (−1.971) and significance (0.496) > α (0.05), this indicates that the interaction of the absolute difference of HCR with ICR has a negative and insignificant effect on the EFOR.

The regression coefficient value of the interaction of the absolute difference of OCR with ICR = −0.265 < 0 with t_{count} (−1.297) > t_{table} (−1.971) and significance (0.196) > α (0.05), this indicates that the interaction of the absolute difference of OCR with ICR has a negative and insignificant effect on the EFOR.

4 Conclusion

Survey questionnaire data were processed using the SPSS application with the following results:

The value of the coefficient of determination (Adjusted R-Squared) is 0.102 or 10.2%. This shows that the 10.2% variation in the EFOR can be explained by free variables, namely HCR, OCR, ICR, HCR interaction with ICR, and OCR interaction with ICR, and the remaining 89.8% are explained by other factors outside this research model.

HCR, OCR, ICR, HCR interaction with ICR, and OCR interaction with ICR simultaneously has a significant positive effect on EFOR.

Partially, HCR has a positive and significant effect, OCR has a negative and significant effect, ICR has a positive and insignificant effect, interaction of the absolute difference of HCR with ICR has a negative and insignificant effect, interaction of the absolute difference of OCR with ICR has a negative and insignificant effect on the EFOR.

From the results of this study, it is suggested that PLN UIKSBU can review the implementation of the OCR and ICR programs, with a relatively small coefficient of determination, the next suggestion is to study other factors that affect EFOR.

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