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EVALUASI BIAYA OPERASI DAN PENYUSUTAN PENDAPATAN PADA PT PLN (PERSERO) WILAYAH PAPUA

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh biaya operasi dan penyusutan terhadap pendapatan PT. PLN (Persero) wilayah papua. Alat analisis yang digunakan dalam penelitian ini adalah regresi berganda untuk mengetahui pengaruh variabel bebas (X) terhadap variable terikat (Y). Hasil penelitian yang dilakukan membuktikan bahwa terdapat pengaruh positif dan signifikan beban operasional terhadap pendapatan. Hal ini dapat dilihat dari nilai ttabel > thitung (3,018 > 2,015) dengan signifikan sebesar 0.048 < 0,05. Hasil penelitian ini menunjukkan adanya hubungan yang signifikan antara beban operasional terhadap pendapatan. Artinya semakin tinggi biaya operasional yang dikeluarkan oleh PT. PLN Persero wilayah Papua akan meningkatkan pendapatan, sebaliknya semakin rendah biaya operasional yang dikeluarkan akan menurunkan pendapatan pada PT. PLN Persero Cabang Jayapyra. Kerugian antara berpengaruh positif dan signifikan terhadap penyusutan pendapatan. Hal ini dapat dilihat dari ttabel > thitung (4,807 > 2,015) dengan signifikansi sebesar 0,041 < 0,05. Hasil penelitian ini menunjukkan adanya hubungan yang signifikan antara penyusutan terhadap pendapatan. Artinya semakin tinggi kerugian yang dirasakan oleh PT. PLN Persero wilayah Papua maka akan mengurangi pendapatan, sebaliknya semakin rendah penyusutan yang dimiliki oleh PT. PLN Persero wilayah Papua maka akan meningkatkan pendapatan.

Kata Kunci: Biaya Operasi, Penyususstan, Pendapatan

ABSTRACT

This study aims to determine the effect of operating costs and depreciation on the income of PT. PLN (Persero) in the Papua region. The analytical tool used in this study is multiple regression to determine the effect of the independent variable (X) on the dependent variable (Y). The results of the study prove that there is a positive and significant effect of operating costs on income. This can be seen from the value of ttable> tcount (3.018> 2.015) with a significance of 0.048 <0.05. The results of this study indicate a significant relationship between operating costs and income. This means that the higher the operating costs incurred by PT. PLN Persero in the Papua region will increase income, conversely the lower the operating costs incurred will decrease income at PT. PLN Persero Jayapyra Branch. Losses between have a positive and significant effect on income depreciation. This can be seen from ttable> tcount (4.807> 2.015) with a significance of 0.041 <0.05. The results of this study indicate a significant relationship between depreciation and income. This means that the higher the loss felt by PT. PLN Persero Papua region, the lower the income will be, conversely, the lower the depreciation owned by PT. PLN Persero Papua region, the higher the income will be.

Keyword: *Operating Expenses, Depreciation, Revenue*

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INTRODUCTION

PT. PLN (Persero) Papua Region which is a State-Owned Enterprise (SOE) company engaged in services as the highest holder of power regarding electricity and has the obligation to provide electricity on an ongoing basis with good quality and conditions. The condition of achieving the target for several years identifies that the company is experiencing problems in the process of actualizing operational costs that have been prepared by the company. In theory, it is explained that the elements that influence the amount of profits earned by the company are the revenues and costs incurred in the company's operational activities. Of course this will also affect the rate of return of the company's fixed assets.

Considering the basic electricity tariff charged to consumers continues to increase for various reasons, it is only natural that consumers in this case electricity service users expect PT PLN (Persero) to provide services by providing better quality. In addition, the financial concept of PT. PLN is a financial concept that states that the task of the organization is to determine the needs, desires, and interests of the target market and provide the desired decisions more effectively and efficiently than competitors by maintaining consumers and the community.

Efficiency is a measure of success judged by the amount of resources sacrificed to obtain certain results. PT.PLN (Persero) Papua Region has a large expenditure on operational costs. The BUMN in the electricity sector must be able to increase sales volume because PLN is the biggest revenue from electricity sales. TDL (Basic Electricity Tariff) which is the selling price of PT PLN electricity to its customers determined by the government has not been able to cover the basic costs of providing electricity so the government must provide an electricity subsidy budget to keep PT PLN (Persero) operating to serve its customers .

The proposed increase in electricity base tariffs proposed to improve the financial performance of PT PLN (Persero) and reduce electricity subsidies received a strong reaction from the public, so the government decided that there was no increase in electricity tariffs (TDL) with the consequences resulting in the swelling of the electricity subsidy budget, on the other hand, PT. PLN (Persero) to increase the shortage of subsidies by doing efficiency, reducing power losses, and reducing other cost items so as to reduce the cost of electricity procurement.

LITERATURE REVIEW

Costs are cash or cash equivalents that are sacrificed to obtain goods or services that are expected to provide current or future benefits for an organization. Cash equivalents means non-cash sources that can be exchanged for the desired goods or services (Usry Carter, 2004). Cost is the main element physically that must be sacrificed for the sake and interests of the company in order to generate profits which is the main goal of the company. Therefore, in its implementation requires very serious attention other than because the cost is also an element of a very large reduction in disbursing net income (Dyckman, 1996)

Costs also play an important role in the calculation of cost of goods, planning, and control. Cost is the main element physically that must be sacrificed for the sake and interests of the company in order to generate profits which is the main goal in the company. Therefore, the implementation requires an element of a very large percentage reduction in the relationship in the search for profit. (Arfan Ihsan, 2009)

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Losses (losses) are energy losses due to technical and non-technical problems. Technical problems are generally caused by the quality of electrical conductivity. The better the quality of electrical conductivity, the lower the shrinkage that occurs. While non-technical shrinkage is generally caused by damage to installations on the network or using inappropriate equipment. Depreciation of the network (losses) is one of the causes of losses experienced by PLN.

Basically, the notion of electricity leakage or loss is the difference between the amount of electricity generated compared to the number of electricity bills suspended or sold to PLN customers. Decree of the Minister of Finance Number: 431 / KMK.06 / 2002, defines that: Losses (losses) are the amount of energy lost in the process of flowing electrical energy from the substation to the consumer. If there is no substation, losses (losses) start from the distribution substation to the consumer.

METHODOLOGY

Conceptual Framework

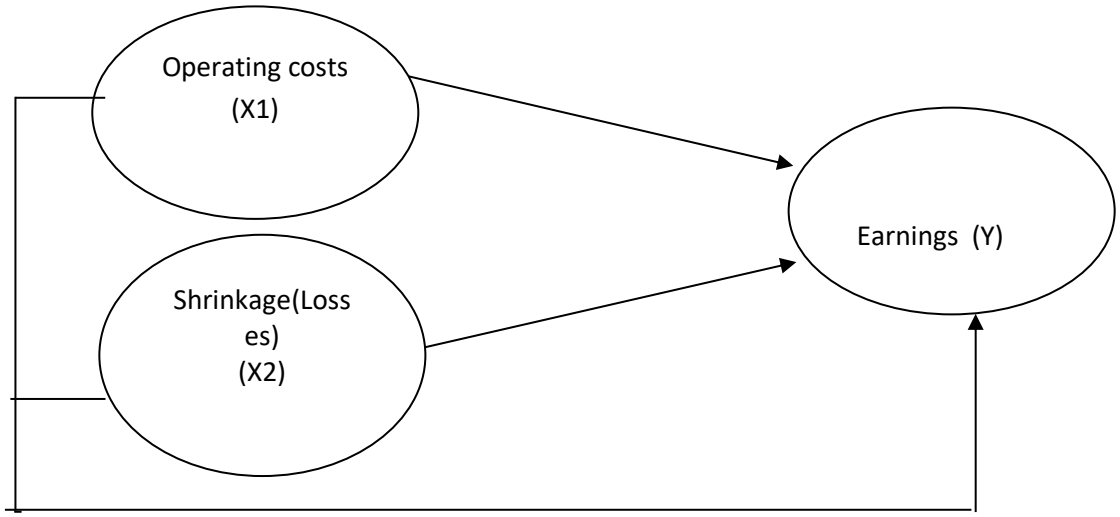

Figure 1. Conceptual Framework

Hypotheses

1. Operating costs affect the earning of PT. PLN (Persero) Papua Region
2. Cost of shrinkage (losses) affect the earning of PT.PLN (Persero) Papua Region.
3. Expected operating costs and cost of shrinkage (losses) affect the earnings of PT.PLN (Persero) Papua Region

Population and Sample

Population is a general area that consists of objects or subjects that have certain characteristics determined by researchers to be studied and then drawn conclusions. The population used in this study is the financial statements and losses reports (losses) PT. PLN (Persero) Papua Region.

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Data analysis method

Methods of data analysis used in this research is multiple linear regression analysis.

RESULTS

Normality Test

Normality test is used to test whether the data used is normally distributed or not. Normal data is having a normal distribution. Tests are carried out using normal probabilty plot curves, provided that if the points on the graph spread and coincide following around the diagonal line, the data used is normally distributed. The following results are obtained for normality tests:

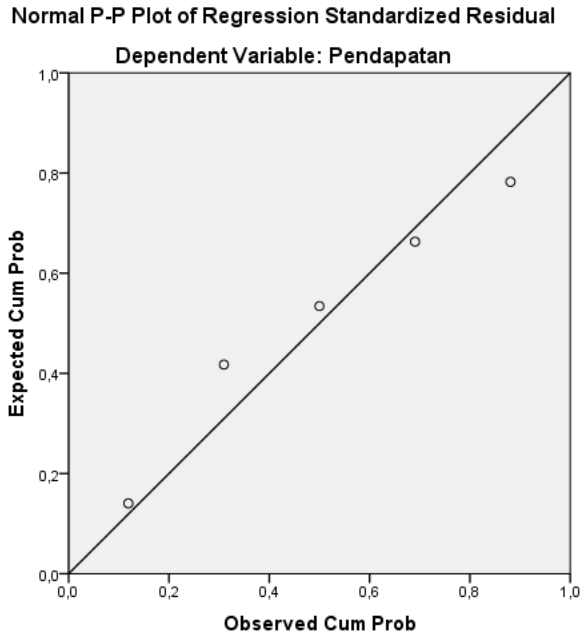

Figure 2. Grafik Normal Probabilty Plot

The results of the normal probability plot curve show that the points on the graph appear to stick and follow the diagonal line, so that based on the normal probability plot curve, the data used are normally distributed.

Heterokedasticity Test

The Heteroscedasticity assumption test is intended to find out whether absolute residual variations are the same or not the same for all observations. If this assumption does not occur heteroscedasticity is not met then the assessment is no longer efficient in both small and large samples. According to (Ghozali, 2007) a good regression model is a model in which heteroscedasticity does not occur, one of which can be done by using scatterplots images. The presence or absence of heteroscedasticity can be seen in the image below.

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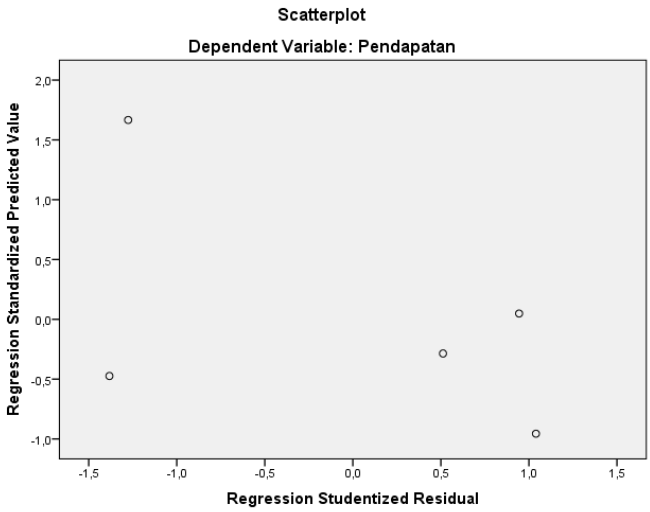

Figure 3. Heterokedasticity Test

Figure 3 above shows that there are no patterns formed in scatter plots as well as random spreading points around zero, so it can be concluded that there is no heteroscedasticity. In other words, it can be said that the variance from the residuals of one observation to another from the independent variables tested is the same (Homoscedastic). Thus this research can be continued with analysis.

Multicollinearity Test

Multicollinearity Test aims to test whether the regression model found a strong relationship between independent variables. Hair et. al. (1998) suggested a way to find out whether there is multicollinearity, by looking at the value of the tolerance value or Variance Inflation Factor (VIF). If the VIF value is less than 0.10 or greater than 10 then multicollinearity occurs and vice versa. VIF values in this study can be seen in the following table:

Tabel 1. VIF (*Variance Inflation Factor*)

Variabel	Tolerance	VIF
Operational costs	.904	1.106
Shrinkage (Losses)	. 904	1. 106

Data Sources Processed, 2015

Based on the multicollinearity test results show that the variable operational costs and losses do not occur multicollinearity, because the tolerance value of each independent variable is above 0.1 and the VIF value of each independent variable is below 10.

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Multiple Linear Analysis

Multiple linear analysis is used to determine the effect of operational costs (XI) and losses (X2) on revenue (Y) at PT. PLN Persero Papua & West Papua Region. As a basis for this calculation the multiple linear regression model is used as follows:

Tabel 2. Summary of Regression Analysis Results

Variabel	*Coefficient β*	T value	*Significant*	Remarks
Constant	75,606			
Operational Costs	1.877	3.018	.048	*Significant*
Shrinkage (Losses)	2.588	4.807	.041	*Significant*
α	= 0.05			
R	= .960			
Coefficient of determination (R_1)	= .921			
F statistic	= 11,674			
Significant	= .049			
T value	= 2,015			

Data Sources Processed, 2015

The regression results obtained based on table 4.5 are as follows:
Y = 75,606 + 1,877X1 + 2,588X2 + e
Here :
Y : Earnings
X1 : Operational costs
X2 : Shrinkage cost (Losses)

a : 75,606 is a constant number which means that if the independent variable X1 and X2 are equal to zero, then the magnitude of the variable Y (income) is 75.606. In other words, if the variable is free from operational costs and the value is considered zero, it means that income will increase by 75,606.

b_1 : 1.877 is the magnitude of the regression coefficient of the independent variable X1 operating costs which means that every increase (addition) to the variable X1 operating costs will increase the dependent variable Y (income) by 1.877. Assuming the other independent variables are constant. If there is a tendency for variable operational costs to increase by 1,877, revenue will increase by 1,877. If there is a downward trend in operating costs, then income will also decrease.

b_2 : 2.588 is the magnitude of the regression coefficient of the shrinking X2 independent variable which means that every increase (addition) to the shrinking X2 variable will increase the dependent variable Y (income) by 2.588. Assuming the other independent variables are constant. If the shrinkage variable tends to increase by 2.588, income will increase by 1.588. If the shrinkage variable has a downward trend, then income will also decrease.

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Hypothesis testing

This study tested the hypothesis with a simple regression analysis method with the help of SPSS version 21.00. Hypothesis testing is done in two ways, first by conducting a significant test of individual parameters (t statistical test).

Test Statistics t

Significant test of individual parameters (t test statistic) basically shows how far the influence of one explanatory or independent variable individually in explaining the variation of the dependent variable. This test can be done by looking at the p-value of each variable. If p-value> 0.05, then the hypothesis is accepted and if p-value> 0.05, the hypothesis is not supported (Ghozali, 2005). The results of the t statistical test can be seen in the following table:

Tabel 3. T statistic Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	75373467124,606	12137954788,792		6,210	,025
	Operating Costs	1,877	,462	,913	3,018	,048
	Shrinkage	2,588	,538	1,004	4,807	,041

Source: Data Processed, 2015

Testing the regression model is used to determine whether the independent variables forming the regression model have a significant effect on individual performance or not. This test is done to test whether the variable operational costs (X1) and shrinkage (X2) or individuals have an influence on income (Y). To test this relationship, a t test is used, i.e. by comparing the value of tcount with ttable. The independent variable forming the regression model is said to have a significant effect if tcount> ttable or significant <α = 0.05.

The operational cost variable has a regression coefficient of 1.877. By using SPSS version 21.00 software help, the t test statistic of 3.018 was obtained with a significance of 0.048. The t-test statistic value is greater than ttable (3.018> 2.015) and also significantly smaller than α = 0.05. This test shows that Ha is accepted so it can be concluded that operational costs have a significant effect on income.

The shrinkage variable has a regression coefficient of 2.588. By using SPSS version 21.00 software, obtained t test statistics of 4.807 with a significance of 0.041. The t-test statistic value is greater than t table (4.807> 2.015) and also significantly smaller than α = 0.05. This test shows that Ha is accepted so it can be concluded that shrinkage has a significant effect on income.

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Test Statistics F

This F-test is used to prove the simultaneous influence between service quality and customer satisfaction on sales levels.

Tabel 4. ANOVA(b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1365621376829233300000,000	2	6828106884146 16600000,000	11,674	,049[b]
	Residual	1169828552843 23760000,000	2	5849142764216 1880000,000		
	Total	1482604232113 557000000,000	4			

Source: data processed, 2015

Testing the effect of independent variables together on the dependent variable is done using the F test. The results of statistical calculations show the value of Fcount = 11.674 with a significance of 0.049 <0.05. With a significance value below 0.05, it shows that together operational and depreciation costs have a significant effect on income at PT. PLN Persero Papua Region.

Coefficient of Determination

The coefficient of determination is used to determine the ability of independent variables in explaining the dependent variable. The magnitude of the coefficient of determination can be seen in adjuted r square and expressed in percentage. The results of the coefficient of determination between operating costs and losses on income can be seen in the following tabell.

Tabel 5. Determination of Coefficient Test Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	,960[a]	,921	,842	7647968857,29550	,921	11,674

Source: data processed in 2015

Based on the table above it can be seen the magnitude of the correlation coefficient (R) of 0.960 which means that the correlation / relationship between the variable operational costs and shrinkage is 96% while the value of R square or the value of the coefficient of determination is 0.921 which means that the independent variable (operational and shrinkage costs) able to explain the dependent variable (income) of 92.1% and the rest of 7.9% can be explained by other factors outside this study.

IMPLICATION

Effect of Operating Costs on Revenue

Hypothesis testing conducted proves that there is a positive and significant effect between operating costs on revenue. This can be seen from the value of t table> tcount (3.018> 2.015) with a significant value of 0.048 <0.05. The results of this study indicate a significant relationship between operating costs to revenue. This means that the higher

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operational costs incurred by PT. PLN Persero Papua & West Papua Region will increase revenue, conversely the lower operating costs incurred will reduce revenue at PT. PLN Persero Papua Region.

This research is in accordance with research conducted by Ruri Handayani, (2012) The results of the simultaneous significance test (F test) show that the variable costs of production, promotional costs, honorarium and agent welfare and the cost of coaching / educating agents have a significant influence together on income premium. While the results of the partial significance test (t test) indicate that production costs have a significant effect on premium income. Variable promotion costs, payment and benefit of agents and the cost of training / education agents do not have a significant effect on premium income.

In general, in carrying out company activities, costs are needed that can help in making daily operations decisions. The term cost is often used with different meanings. In carrying out its activities, a company will incur various types of costs including material costs, direct wages and overhead costs where these three costs are called production costs. Other costs for smooth sales or marketing and administrative operational costs.

Costs can be interpreted as acquisition costs, cost of goods or can also be interpreted as all sacrifices starting from raw materials then goods in the process until the goods can be sold. Understanding these costs will be blurred when compared with costs (expenses), where the two pengerian is often used ambiguously. Operating costs or also called Operating Expenses are a number of costs that must be incurred by a company to support operations or activities carried out by the company. Operational costs can usually be in the form of costs for sales and administration to boost revenue, and are not included in expenses that have been calculated in the cost of goods sold (COGS), or depreciation factors. Operational costs are also assumed to be the costs required to process raw materials into ready-to-sell products. Some examples include the depreciation of machinery, the cost of purchasing raw materials, and employee salaries.

If you view the object of expenditure, in general, production costs are divided into 3 categories, namely the cost of raw materials, direct labor costs, and factory overhead costs. Costs related to raw materials and labor are classified as main costs, while direct labor costs and factory overhead costs are classified as conversion costs. Operating costs or operational costs consist of two words namely "Costs" and "Operations according to the big Indonesian dictionary, costs means money spent to make (establish, do, etc.) something; fees; shopping; spending. Whereas operational means operationally; related to surgery.

Effect of Shrinkage on Revenue

Hypothesis testing conducted proves that there is a positive and significant effect between losses on income. This can be seen from the value of t table> tcount (4.807> 2.015) with a significant value of 0.041 <0.05. The results of this study indicate a significant relationship between losses to income. This means that the higher the shrinkage felt by PT. PLN Persero Papua & West Papua Region will reduce revenue, conversely the lower the shrinkage owned by PT. PLN Persero Papua Region will increase revenue.

The results of this study are consistent with research conducted by Siska Diyah Rosmawati (2012), it is known that there is a very strong and positive relationship between losses (losses) distribution of electricity and income, while based on the test of

using hypotheses and student's t test, this means that the research accept the Ha hypothesis and reject Ho or based on the results of t-test calculations concluded losses (losses) have an influence on income.

Losses (losses) are energy losses due to technical and non-technical problems. Technical problems are generally caused by the quality of electrical conductivity. The better the quality of electrical conductivity, the lower the shrinkage that occurs. While non-technical shrinkage is generally caused by damage to installations on the network or using inappropriate equipment. Depreciation of the network (losses) is one of the causes of losses experienced by PLN.

Basically, the notion of electricity leakage or loss is the difference between the amount of electricity generated compared to the number of electricity bills suspended or sold to PLN customers. Decree of the Minister of Finance Number: 431 / KMK.06 / 2002, defines that: Losses (losses) are the amount of energy lost in the process of flowing electrical energy from the substation to the consumer. If there is no substation, losses start from the substation distribution to consumers. This loss is caused by two factors, namely technical factors in the form of network problems and non-technical factors which are not synchronized in recording usage or in calculating kWh. In economic terms these losses are closely related to the issue of cost efficiency, so that conclusions can be drawn the more inefficient (high costs) the smaller the profit from the income obtained. The inefficiency of costs incurred in the flow of electrical energy is closely related to problems in terms of technology and the role of human resources.

CONCLUSION

Based on the results of the discussion, the following conclusions can be drawn:

Operating costs have a significant effect on income at PT. PLN Persero Papua Region. This means that operating costs have a positive effect on revenue, but in terms of profit will decrease. In other words, the smaller operational costs incurred by PT. PLN Persero Papua Region can increase revenue, but conversely the greater the operational costs of profits obtained will be smaller but revenue will increase. Shrinkage has a significant effect on income at PT. PLN Persero Papua Region. This means that losses have a positive effect on income. In other words, the higher losses experienced by PT. PLN Persero Papua Region income will be decreased.

REFERENCES

Arfan Ihsan, I.B Teddy Prianthara. 2009. Accounting for Managers. Yogyakarta: Graha Science.

Dyckman, Thomas R. et al. 1996. Intermediate Accounting volume 1 edition 3. Erlangga.

Usry, Carter. 2004. Cost Accounting 13th edition of book 1. Translated by Krista S.E, Ak. Jakarta: Salemba Empat Archives of PT.PLN (Persero) Papua Region

Rosmawati, Diyah Siska.2011. The Effects of Losses in Electric Energy Distribution on Revenue. PT.PLN (Persero) Distribution of West Java and Banten

Karno, Devi Sukma Shinta.2012. Analysis of Operational Cost Budget and Revenue Budget on Financial Performance Based on Return on Assets (ROA) Ratio. PT. Graha Sarana Duta Palembang.

Lestari, Praise Retno.2011. Analysis of Operational Cost Budget Analysis as a Tool for Controlling Operational Costs. PT.PLN (Persero) Distribution of East Java Service Area and South Surabaya Network.

Mansyur, Anwar.2011. Analysis of the Effect of Operating Costs and Revenue Budgets on Financial Performance Based on Return on Assets (ROA). PT.PLN (Persero) Center.

Handayani, Ruri.2011. Analysis of the Effect of Operational Costs Against Premium Income. PT. Asuransi Jiwasraya (Persero) Medan Regional Office.

http://elib.unikom.ac.id/files/disk1/542/jbptunikompp-gdl-nomiandriy-27081-6-12.uniko-i.pdf

http://repository.usu.ac.id/bitstream/123456789/4/Chapter%20II.pdf

http://harga.web.id/pengahaman-dan-klasifikasi-biaya-operasional.info

www.sinarindo.com/service.htm

http://skripsitesisdisertasi.com/pend understanding_ income