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Efficiency Analysis of Fixed Broadband Service Management Industry: Measurement of the Integrated DEA Model

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ABSTRACT

The goal of this study was to examine the level of efficiency of fixed broadband service providers as a measure of the research model's input as influenced by internal and external factors. *Non-parametric* approaches, *Data Envelopment Analysis (DEA)* models, and Path Analysis were used in this study to assess the efficiency of Fixed Broadband Service Providers. The reason for the study is that the ability to generate income to obtain maximum profit in order to be in a strategic position for business competitiveness is a key component to consider for the Fixed Broadband Service Provider industry in order to ensure business continuity. The research findings indicate that the input variable has an impact on the output variable. For the 2015 – 2020 period, the input size in the form of Total Assets has an impact on the Cost Flow Investing Act, total subscribers, and fiber optic backbone network, all of which affect the efficiency of Fixed Broadband Service Providers as many as 5 (five) Big Providers (The Big Five). External factors such as Customer Price Index (CPI) and Interest Rates, on the other hand, have a favorable impact on Operator Efficiency.

Keywords: CPI, DEA, Efficiency, Financial Performance, GDP, Interest Rate.

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I. INTRODUCTION

The development of internet protocol-based network technology has influenced the increase of internet data traffic in Indonesia, indicating a growing demand for internet access services via fiber optic cable networks (fixed broadband). The fixed broadband internet access service market, on the other hand, has not yet achieved an efficient level, with up to 85 percent of fixed broadband consumers using the services of one dominating provider (Kemkominfo, 2021), and this service dominates the fixed broadband internet market in Indonesia. The dominance of this service provider demonstrates the absence of competition in Indonesia's fixed broadband market. This has an impact on the speed and quality of internet access as well as the cost. The average fixed broadband internet download speed in Indonesia is still low at 21.28 Mbps, according to statistics from the (Almenteros, 2020). The average price affordability index for fixed broadband in Indonesia is likewise still low, at 0.15 percent (The World Bank Group, 2021). Furthermore, the average fixed broadband pricing in 2019 was $18.09 (average ARPU Blended), compared to the purchasing power of Indonesia's GNI PPP per capita of $11,940 (The World Bank Group, 2021). In 2019, Indonesia's fixed broadband subscriber index (fixed broadband subscription per 100 people) displays a value of 3.8, which is still low (The World Bank Group, 2021). Another indicator that the level of competition is not yet optimal is the low distribution of fixed broadband access (penetration) in Indonesia, where only 11.6 million subscribers (or 16.78 percent of 69 million households) subscribe to fixed broadband (Kemkominfo, 2021), compared to ASEAN countries with penetration rates of over 30% (Almenteros, 2020). Ninety two point eight (92.8) percent of Indonesian broadband households have packages that are less than 100 Mbps (low prices). These issues are obstacles that may slow the telecommunications industry's growth rate, eventually affecting the community's degree of distribution and equal access to telecommunications services.

The competition that exists in this market has an impact on provider performance, which may be assessed in terms of increased productivity, lower pricing, and better service quality. Because of the enormous number of fixed broadband service providers, this rivalry can lead to market saturation, which causes increasingly harsh competition among providers. In this situation, the operator must have the ability to create a business model in order to meet business objectives such as maximizing revenue, overcoming obstacles, and gaining a competitive advantage in the telecommunications industry. As a result, the company's primary purpose is efficiency. The use of available resources as inputs to achieve maximum output is referred to as efficiency. Where efficiency is measured by the presence of highly valued service items, incentives for innovations that result in improved services, and incentives derived from improving manufacturing processes. The fixed broadband service industry's business process must be appropriately

managed by determining the right strategy, specifically a strategy that can support both service provision and customer migration or service migration.

The importance of efficiency considerations for fixed broadband Service Providers in the face of performance assessments is that efficient resource usage will result in cheap pricing, high productivity, high innovation, and resource savings. If each provider competes in detecting consumer needs and increases innovation, it will be able to offer service items that meet those demands at competitive costs since the resources used are more productive, affecting sales volume.

Efficiency assessments of industry performance are used to ensure the growth of a competitive industry in the short and long term. The customer-oriented development trend in the telecommunications industry will have a significant impact on economic growth. Furthermore, the importance of assessing efficiency in inefficient fields can be used to improve the future of an industry (Othman, *et al*., 2016). Managers can assess or measure efficiency to analyze firm performance and identify areas of inefficiency for future improvement (Mostafa, 2007). Inefficiency is not limited to poor management performance; it can also be caused by managerial, technological, and socioeconomic factors (Sherman & Zhu, 2006). Fixed broadband service providers' efficiency is highly dependent on a variety of factors, including economic growth, market volatility, labor price levels, energy costs, and others. Furthermore, it is critical to understand the factors that can directly affect the level of efficiency in order to determine which determinants make the organizers' performance inefficient.

Efficiency analysis in the telecommunications sector has piqued the interest of academics and policymakers. The SFA method was used by Riko *et al*. (2019) to conduct a technical efficiency analysis, which revealed that telecommunication companies in Asia Pacific have lower technical efficiency than those in developed countries. Suleiman *et al*., 2017) determined that only three (three) cellular phone operators out of seven (seven) operators studied were efficient using Data Envelopment Analysis (DEA), Non-Radial and Oriented Model on Slack-based Measure (Devaki, 2020), the financing pattern of telecommunication service companies provides analysis results that describe the company's capital structure, which is important to maintain a good solvency position. Kayisire & Wei (2016) evaluated the efficiency of mobile phone operators using DEA to measure various benchmarking industries and evaluate the performance of Information and Communication Technology (ICT) adoption in Africa. However, Diskaya *et al*. (2011) used the DEA method and the Malmquist Total Factor Productivity Index to conduct technical measurements of efficiency in the telecommunications sector, using annual management activity reports and various input and output variables obtained from various research institutions.

The goal of this study was to examine the level of efficiency of fixed broadband service providers as a measure of the research model's input as influenced by internal and external factors. Non-parametric approaches, Data Envelopment Analysis (DEA) models, and Path Analysis were used in this study. This study was focused on 5 (five) major fixed broadband service providers from 2015 to 2020.

The novelties of this study are efficiency analysis from a financial perspective, efficiency analysis from technical factors, and efficiency analysis from macro factors in telecommunications companies providing fixed broadband services using data envelopment analysis in order to develop the best knowledge related to efficiency in the telecommunications industry. This study focuses on fixed broadband service providers in Indonesia with similar conditions in terms of technology, company nature, duration of operation, and scope of service. The financial data for the organizers under consideration were obtained from publicly available annual reports. Some technical data obtained from the Directorate of Telecommunications, Communications and Informatics, and macro data obtained from the Indonesian Central Statistics Agency.

II. METHODOLOGY

The goal of this research is to collect all information available about the efficiency of fixed broadband service providers by measuring internal and external factors that influence the provision of fixed broadband services. The dataset under consideration is based on the Big Five fixed broadband service providers in Indonesia (2015–2020). The data analysis method employed quantitative methods, which were used to collect quantitative data in order to make precise measurements of efficiency.

The method used in this study was a non-parametric approach that employed a mathematical method, namely the DEA method, to assess efficiency. The DEA efficiency score for a specific decision-making unit (DMU) in a sample data set was not an absolute standard but was regarded as such by other DMUs. The main distinction between these two models is return to scale (RTC). CCR employed a constant return to scale (CRC) surface, whereas BCC employed a variable return to scale (VRT) surface. For input and output, both models can be scenario-oriented or non-oriented. The CRT model, a non-radial, oriented slack-based measure (SBM), was used in our study to evaluate efficiency. The DEA Oriented NonRadial MBS efficient methodology was used to assess the DMU's relative efficiency (organizer). Non-radial SBM is considered efficient because it has a direct effect on slack input and non-radial output when efficiency scores are computed (Tone, 1999). In this case, the concept of non-radial is important in evaluating efficiency by measuring output shortages and input surpluses.

Measuring efficiency through the use of input variables such as total assets and intermediate variables are *cost flow investing act*, *total subscribers*, and *fiber optic backbone network*. CPI and interest rates are examples of external input variables. The revenue generated by the Operator is the output variable. Economic Decision Units (*UKE*) are used to calculate relative efficiency when there are multiple inputs and outputs. UKE's relative efficiency is defined as a ratio of Total Weighted Output/Total Weighted Input > 1. The Big Five Fixed Broadband Service Providers in Indonesia were studied by the Economic Decision Unit (*UKE*). The application program used is DEAP Software Version 2.1, which generates a relative technical efficiency value between the *UKEs* being compared and is used as a reference for other

UKEs to improve their efficiency level if it generates a score of 1. Those who receive a score of <1 is considered inefficient.

The relationship of each variable studied was created in order to collect data and test the hypothesis. This study's hypothesis is that total assets affect the *cost flow investing act* (H_1), total assets affect *total subscribers* (H_2), total assets affect the *fiber optic backbone network* (H_3), *cost flow investing act* affects *revenue* (H_4), *total subscribers* affect revenue (H_5), *fiber optic backbone network* affects revenue (H_6), CPI affects revenue (H_7), and interest rates affect revenue (H_7) (H_8).

Path Analysis was used to analyze the data, which was done with the SPSS Version 20.0 software application. Due to the rejection test criteria H_0 if $X^2_{count} \geq X^2$ table and p-value is significant, the model used in the panel regression with Path Analysis is the REM (Random Effect Model) approach. Hypothesis testing is used to determine the effect of the independent variable on the dependent variable, and it includes the Partial Test (T Test) and Simultaneous Test (F Test). Using a significance level of α=0,05, hypothesis is formulated that H_i; $\beta_1 = \beta_2 = \beta_3 \neq 0$ (there is no significant effect of the independent variable on the dependent variable).

If $t_{count} < t_{table}$, then the independent variable has no effect on the dependent variable. If $t_{count} \geq t_{table}$, then the independent variable influences the dependent variable only partially. If $F_{count} < F_{table}$, then all independent variables have no significant effect on the dependent variable. If $F_{count} \geq F_{table}$, then all independent variables affect the dependent variable simultaneously. The scale of each variable's influence, both partially and simultaneously, is measured using the Coefficient of Determination (R^2). The coefficient value ranges between 0 and 1, with a value close to 1 indicating that the independent variables provide nearly all of the information required to predict the variation of the dependent variable.

III. Results And Discussion

This study's findings are based on the DEA design, which employs one input variable, five mediating input variables, and one output variable. The model is calculated using the constant returns to scale (CRS) and variable returns to scale (VRS) assumptions (VRS). According to the Efficiency test results (shown in Table I), the five major fixed broadband service providers have varying levels of efficiency. During the research period, Telkom had a value of 97.9%, Link Net had a value of 96.95%, Icon Plus had a value of 100%, Moratel had a value of 95.43%, and Bali Towerindo had a value of 84.8%**.** These findings show that the organizers' total assets did not provide financial operational efficiency during the research period for Telkom, Link Net, Moratel, and Bali Towerindo (<100%). On the other hand, Icon Plus obtained efficiency = 1 (constant return scale) or 100 % average efficiency during the research period.

Telkom achieved efficiency = 1 (constant return scale) in 2019 and 2020, Link Net in 2015, Icon Plus in 2016 and 2017, Moratel in 2015 and 2017, and Bali Towerindo in 2017. In 2016, 2017, 2019, and 2020, Link Net was one of the operators experiencing declining returns to scale (drs). It occurred to Icon Plus in 2018, 2019, and 2020. Moratel was affected in 2016, 2018, 2019, and 2020. It also occurred to Bali Towerindo in 2018, 2019, and 2020. A company is said to be efficient if it can produce more output with a given amount of input; more output per unit of input indicates greater efficiency, while maximum output per unit of input indicates optimal efficiency (Othman *et al*., 2016).

TABLE I: DEA Efficiency Values

Descriptive Statistics		N	Min	Max	Mean	Std. Deviation
Telkom	crste	6	1.000	1.000	1.00000	0.000000
	vrste	6	0.887	1.000	0.97900	0.045193
	se	6	0.571	1.000	0.87050	0.184740
Link Net	crste	6	0.699	1.000	0.90133	0.152886
	vrste	6	0.894	1.000	0.96950	0.048132
	se	6	0.699	1.000	0.78717	0.110380
Icon Plus	crste	6	0.696	1.000	0.86533	0.152329
	vrste	6	1.000	1.000	1.00000	0.000000
	se	6	0.696	1.000	0.86300	0.149943
Moratel	crste	6	0.482	1.000	0.87217	0.215535
	vrste	6	0.726	1.000	0.95433	0.111860
	se	6	0.482	1.000	0.84667	0.203641
Bali Towerindo	crste	6	0.000	1.000	0.36717	0.494913
	vrste	6	0.088	1.000	0.84800	0.372322
	se	6	0.021	1.000	0.50000	0..368803

Source: DEAP Version 2.1.

Every year, according to test frontier composition (Table II), Icon Plus has a vrste efficiency value of 100%, with the most effective years in 2016 and 2017. The average vrste technical efficiency is supported by an increase in revenue received each year, particularly in 2018 and 2020, when revenue from fixed broadband service increased. Telkom's management was most effective in evaluating efficiency related to this research model in 2019 and 2020, although the VRSE value at 100% efficiency was not as effective in 2015 as it was in those two years. The years 2019 and 2020 showed efficient values in line with Telkom's annual revenue growth. The revenue increase was caused by extremely high service needs beginning in 2015 and increasing in 2020 due to the need for fixed broadband services during the pandemic.

Moratel's most effective period in evaluating efficiency related to this research model was obtained in 2015 and 2017, although the VRSE efficiency value at 100% efficiency was not as effective in 2018, 2019, and 2020 as it was in those two years. The years 2018, 2019, and 2020 demonstrated the efficient value of vrste but were not accompanied by a revenue trend, with revenue declining in those years. Link Net obtained efficient scores in 2015 and the effective vrste period in 2016, 2019, and 2020, which corresponded to revenue growth in those years. Bali Towerindo has the lowest average efficiency of the four organizers, despite the fact that revenue is increasing year after year.

Total asset efficiency was not demonstrated by the value of cost flow investing act, total subscribers, and fiber optic backbone network, CPI, interest rates, and income in 2015 for Telkom, Icon Plus, and Bali Towerindo, according to the efficiency scale as a result of the DEA evaluation. In 2016, Telkom, Moratel, Link Net, and Bali Towerindo all experienced the same thing. It happened in 2017 for Telkom and Link Net. It happened in 2018 for the five organizers. Except for Telkom, the four organizers experienced it in 2019 and 2020. When a company uses total assets as capital to carry out business operations, it technically does not provide optimal efficiency values to company revenues each year.

Assets, cost flow investing act, total subscribers, fiber optic backbone network, CPI, and interest rates have no significant impact on the financial performance of the organizers in general. Telkom, Icon Plus, and Moratel were all in the frontier (crs) at least twice during the research period.

TABLE II: FRONTIER COMPOSITION

Operators	Year	crste	vrste	scale	crs/ drs/irs	E/TE
Telkom	2015	0.571	1.000	0.571	irs	TE
	2016	0.703	0.992	0.708	irs	TE
	2017	0.953	0.995	0.958	irs	TE
	2018	0.874	0.887	0.986	irs	TE
	2019	1.000	1.000	1.000	crs	E
	2020	1.000	1.000	1.000	crs	E
	Mean	0.850	0.979	0.870		
		Number of crs			2	
Icon Plus	2015	0.986	1.000	0.986	irs	TE
	2016	1.000	1.000	1.000	crs	E
	2017	1.000	1.000	1.000	crs	E
	2018	0.800	1.000	0.800	drs	TE
	2019	0.696	1.000	0.696	drs	TE
	2020	0.696	1.000	0.696	drs	TE
	Mean	0.863	1.000	0.863		
		Number of crs			2	
Moratel	2015	1.000	1.000	1.000	crs	E
	2016	0.712	0.726	0.980	drs	TE
	2017	1.000	1.000	1.000	crs	E
	2018	0.867	1.000	0.867	drs	TE
	2019	0.751	1.000	0.751	drs	TE
	2020	0.482	1.000	0.482	drs	TE
	Mean	0.802	0.954	0.847		
		Number of crs			2	
Link Net	2015	1.000	1.000	1.000	crs	E
	2016	0.795	1.000	0.795	drs	TE
	2017	0.711	0.923	0.770	drs	TE
	2018	0.671	0.894	0.750	irs	TE
	2019	0.699	1.000	0.699	drs	TE
	2020	0.709	1.000	0.709	drs	TE
	Mean	0.764	0.970	0.787		
		Number of crs			1	
Bali Towerindo	2015	0.435	1.000	0.435	irs	TE
	2016	0.803	1.000	0.803	irs	TE
	2017	1.000	1.000	1.000	crs	E
	2018	0.049	0.088	0.559	drs	TE
	2019	0.021	1.000	0.021	drs	TE
	2020	0.182	1.000	0.182	drs	TE
	Mean	0.415	0.848	0.500		
		Number of crs			1	

Results from DEAP Version 2.1.
Note: crste = technical efficiency from CRS DEA.
vrste = technical efficiency from VRS DEA.
scale = scale efficiency = crste/vrste.
E = Efficient, TE = Not Efficient.

Companies with assets are thought to be efficient because their assets can drive the cost flow investing act, increase and maintain the number of subscribers, and support ownership of the fiber optic backbone network; all of which help to boost revenue. The DEA test demonstrates that asset owners are efficient even if they cannot fully support the increase in their income.

Based on the model selection test in panel data regression, the best model was a random effect model, with the results shown below.

1) Total Assets' Impact on Cost Flow Investing Act, Total Subscribers, Fiber Optic Backbone Network, and Revenue

The statistical t-test is used to carry out the test. The test results show (Table III) that the *p-value* for all independent variables is Sig. 0.000<.05, indicating that H_0 is rejected. This means that Hypotheses 1, 2, 3, 4, 5, and 6 are partially accepted, namely that total assets have a significant effect on Cost Flow Investing Act, Total Subscribers, and Fiber Optic Backbone Network and have an impact on Revenue.

TABLE III: COEFFICIENTS[A]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	208.21	353.69		0.59	0.56
	X (Aset)	0.135	0.007	0.967	20.08	0.00
a.	Dependent Variable: Y_1 (*Cost Flow Investing Act)*					
2	(Constant)	10199.6	2493.1		4.09	0.00
	X (Aset)	1.144	0.047	0.977	24.18	0.00
a.	Dependent Variable: Y_2 *(Total Subcribers)*					
3	(Constant)	230609.85	348692.01		0.66	0.51
	X	135.294	6.617	0.968	20.44	0.00
a.	Dependent Variable: Y_3 *(Fiber Optic Backbone Network)*					
4	(Constant)	591.46	790.48		0.74	0.46
	Y_1	2.273	0.107	0.970	21.23	0.00
	Y_2	0.273	0.011	0.978	24.81	0.00
	Y_3	0.002	0.000	0.971	21.36	0.00
a. Dependent Variable: Z (Revenue).						

Total Assets has a 93.5% influence on the Cost Flow Investing Act. Total Subscribers. and Fiber Optic Backbone Network (Table IV). This means that the operator's total assets used to carry out the company's operations contribute to a 93.5% increase in internal technical factors.

TABLE IV: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.967[a]	0.935	0.933	1666.639

a. Predictors: (Constant). X- Aset.
b. Dependent Variable. Y_1. Y_2 dan Y_3.

The F_{count} value is 451.103. with a *p-value* (sig) of 0.000. based on the test results. Because of the *p-value* < α (0.000 < 0.05). H_0 is rejected. indicating that the Cost Flow Investing Act. Total subscribers. and Fiber Optic Backbone Network all have an effect on income simultaneously (shown in Table V).

TABLE V: ANOVA[A]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6185242020.8	1	6185242020.8	451.1	0.000[b]
	Residual	383918475.94	28	13711374.1		
	Total	6569160496.8	29			

a. Dependent Variable: Z – Income.
b. Predictors: (Constant). Y1. Y2. Y3.

The Cost Flow Investing Act. Total Subscribers. and Fiber Optic Backbone Network all have a 94.2% impact on Revenue. This means that the value of the Cost Flow Investing Act. Total Subscribers. and Fiber Optic Backbone Network owned by the operator in carrying out the company's operations all contributed to a 94.2% increase in revenue (Table VI).

TABLE VI: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.970[a]	0.942	0.939	3702.887

a. Predictors: (Constant). Y_1. Y_2 dan Y_3
b. Dependent Variable.

2) The Impact of the Consumer Price Index (CPI) and Interest Rates on Income

Table VII shows the *p-value* for the independent variable is Sig. 0.958 > 0.05. then H_0 is accepted. implying that

Hypotheses 7 and 8 are partially rejected. namely that CPI and interest rates have no partially significant effect on Income.

TABLE VII: COEFFICIENTS[A]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11031.58	32738.66		0.34	0.739
	Y_4	13.89	260.60	0.01	0.05	0.958
	Y_5	1258.28	2229.54	0.11	0.56	0.577

a. Dependent Variable: Z *(Revenue).*

The R Square test results show that the CPI variable has a 0% contribution to income. indicating that it has no contribution to income. Similarly. the R Square for interest rates is only 0.1% of income (Table VIII).

TABLE VIII: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	**Std. Error of the Estimate**
1	0.010[a]	0.000	-0.036	15316.300
2	0.106[a]	0.011	-0.024	15230.695

a. Predictors: (Constant). Y_4 dan Y_5
b. Dependent Variable.

According to the findings of this study. the total assets owned by fixed broadband telecommunications service providers have a significant influence on decisions related to the Cost Flow Investing Act. Cash flow from investing activities (CFI) is a component of the cash flow statement that reports how much cash was generated or issued as a result of various investment-related activities during a given period. Purchasing physical assets. investing in securities. and selling securities or assets are all examples of investment activities (Kenton. 2021). Total assets owned can also result in an increase in total subscribers as well as an increase in Fiber Optic Backbone Network ownership. Fixed broadband subscriptions are fixed subscriptions for high-speed Internet access (TCP/IP connection) with downstream speeds equal to or greater than 256 kbit/s. Cable modems. DSL. fiber-to-the-home/building. other fixed (wired) broadband subscriptions. satellite broadband. and terrestrial fixed wireless broadband are all examples of this (BCCS. 2019). Increased total assets can cause the company's internal technical factors to rise. increasing the return on capital used and investment. Finally. the three mediating variables have an effect on increasing income. This first model aids in the measurement of business efficiency in finance. Shankhdhar (2021) examines the Financial Performance of Telecommunication Sector Companies. revealing that there are significant differences in each company's management. with only 2 (two) of the four (four) telecommunication companies studied demonstrating good performance. Total assets owned can also result in an increase in total subscribers as well as an increase in Fiber Optic Backbone Network ownership. Increased total assets can cause the company's internal technical factors to rise. increasing the return on capital used and investment. Finally. the three mediating variables have an effect on increasing income. This first model aids in the measurement of business efficiency in finance.

However. the data from the tests show that the CPI and interest rates have no effect on the models of the two studies. According to the results of hypothesis testing. CPI and interest rates do not have a significant effect on company income. either partially or simultaneously. The CPI and interest rates both contributed 0% and 0.1%. respectively. This second model demonstrates that the contribution value is insignificant and has no effect on any changes in revenue received by the organizers. The Cost Flow Investing Act. total subscribers. and the Fiber Optic Backbone Network is unlikely to limit the development of telecommunications infrastructure for growth and product development.

The enormous fixed broadband market potential in Indonesia presents numerous opportunities for operators competing in the provision of fixed broadband services. One of the efforts to increase Indonesia's GDP per capita to support the community's economic sector is the productive use of fixed broadband services as a means of connectivity. communication. access to information and knowledge. education. and business convenience. The findings of this study indicate that changes in interest rates and the CPI that have no effect on provider revenue levels are a measure of investment certainty for providers. which can encourage maximum service provision in an effort to support digital economy.

Fixed broadband providers may be encouraged to continue investing in this service market if the investment climate remains stable. Investment in fiber optic backbone networks is an important part of increasing the total assets owned by the organizers. which can lead to an increase in the number of subscribers (customers). resulting in an increase in the number of operators' income. Investment in network infrastructure in fixed broadband is critical for operator operators in order to meet the regulator's service quality requirements. Furthermore. the certainty of investment conditions in which external factors have little influence on increasing operator revenue is an opportunity for operators to offer fixed broadband services. This can drive and create healthy competition so that the fixed broadband ecosystem reaches an optimal level of corporate economic value and provides a competitive advantage.

IV. CONCLUSION

The dynamics of fixed broadband service development have an impact on improving service delivery. financial inclusion. and the development of digital initiatives across all sectors. In this regard. the Indonesian government's policy relies on the availability and affordability of information and communication technology services. Fixed broadband operators have an opportunity to compete to gain a competitive advantage in their business participation in this matter. The fixed broadband service industry in Indonesia is competitive and diverse. People involved in this business vary in terms of business scale. service scale. and business maturity. This is also reflected in the financial sector's efficiency variations in industry performance.

Based on the results of the DEA analysis test. it is known that Icon Plus is the fixed broadband service provider with an average efficiency value of 1 (one) or 100% during the observation period. Telkom came in second with an average efficiency of 97.9%. Link Net came in third with 96.95%. Moratel came in third with 95.43%. and followed by Bali

Towerindo came in fourth with 84.8%. Fixed broadband operators' total assets have provided financial operational efficiency in the Cost Flow Investing Act. increased number of subscribers. improved Fiber Optic Backbone Network owned. These three factors can increase the return on capital employed as well as the impact of investment on increasing income.

The hypothesis testing results show that the total assets owned by the organizers during the research period have an effect on the Cost Flow Investing Act. Total Subscribers. and Fiber Optic Backbone Network. as well as Revenue. The value of the total assets owned by the operator in carrying out the company's operations contributes to a significant increase in internal technical factors. which has a significant impact on increasing the operator's revenue. External factors. such as the CPI and interest rates. had no effect on the organizers' revenue during the study period. Based on the findings of this study. it is clear that the organizers are unaffected by external macro factors. but internal factors have the ability to keep the business running smoothly. This is due to the fact that the fixed broadband sector of telecommunications has become a source of superior innovation and mandatory investment for all sectors.

Fixed broadband service providers can increase the value of efficiency by focusing on adding value and improving the overall quality of their assets. Total assets must be maintained and preserved for a business to continue to grow at its maximum value. Furthermore. in order to mobilize and create healthy competition. joint efforts must be made to open up the fixed broadband service industry and facilitate new business opportunities. Given the maximum impact that communication services can have. it is best to reinvest in growing the sector. This reinvestment is anticipated to increase market penetration. It is critical that regulators prioritize capitalizing on potential returns from the telecommunications sector.

We will test the feasibility of the research model used for submarine cable telecommunication services in Indonesia in a future study. This study is intended to establish a broad service coverage in order to provide a more realistic meaning. Furthermore. the test can be extended to satellite services in order to compare the efficacy of various types of telecommunication services.

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