



THE FINANCIAL PERFORMANCE OF TELECOMMUNICATIONS COMPANIES BEFORE AND DURING THE COVID-19 PANDEMIC: A MANOVA APPROACH

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ABSTRACT

The COVID-19 pandemic has posed challenges for business entities, including those operating in the telecommunications sector; potentially affecting their financial performance. Telecommunications businesses that demonstrate rapid adaptability and high innovation capabilities in adverse conditions amid the COVID-19 pandemic are more likely to survive in such difficult situations. This capability is a strong asset to achieve business sustainability in the post-COVID-19 era. This study aims to conduct a comparative analysis of the financial performance of telecommunications companies before and during the COVID-19 pandemic. The analysis of this study used the Multivariate Analysis of Variance (MANOVA) method. The results showed that there was no significant difference in the financial performance of telecommunications companies simultaneously based on financial ratios between the period before and during the COVID-19 pandemic.

Keywords: telecommunications sector, financial performance, comparative analysis, MANOVA, COVID-19 pandemic.

1. Introduction

The COVID-19 pandemic has caused major shocks to many economic sectors around the world. The COVID-19 pandemic caused serious disruptions in human society and unprecedented health and economic crises (Nascimento, Erick Giovanni Sperandio, Badaro, 2020). The COVID-19 pandemic has had a devastating impact on most industries and commercial sectors around the world (Shoukat & Matriano, 2022). The spread of the coronavirus and the imposition of stay-at-home rules have increased uncertainty and reduced economic activity in various economic sectors globally, resulting in the closure of financial markets, businesses, corporate offices, and other social activities (Mulyono, 2023). A number of anticipatory measures such as lockdowns, event bans, social distancing, and shutdowns to control the spread of the COVID-19 pandemic had a profound adverse impact on economic activity and created a new crisis that was assumed to be more devastating than previous crises (Jebran & Chen, 2023; Stalmachova & Strenitzerova, 2021).

Major shocks due to the COVID-19 pandemic were also experienced by the telecommunications sector. The telecommunications industry is also not immune to the effects of COVID-19 because the industry has also felt a major impact from the crisis (Mohamed, 2020). The COVID-19 pandemic affected most telecom employers, who had to take various measures to protect employees, forcing companies to make rapid changes to the standard way of working, changing work organizations, and generally working to mitigate the economic impact of the pandemic (Stalmachova & Strenitzerova, 2021).

Due to the COVID-19 pandemic and its relationship with the telecommunications sector, it is interesting to try to analyze the relationship. This paper aims to compare the condition of telecommunications companies before and during the COVID-19 pandemic. The telecommunications company in question is a telecommunications company in Indonesia. Then the condition of the company that is compared is its financial performance.

2. Literature Review

The telecommunications sector is a broad and diverse business activity. The telecommunications sector includes various sub-sectors of communication facilities such as the internet, telephone, both wired and wireless executables (Beers, 2023; Shoukat & Matriano, 2022). The telecommunications service industry consists of digital infrastructure (such as fiber, telecommunication towers, active networks, and data centers), operators (mobile and fixed broadband, data centers, and cloud computing), and applications (broadband connections, telephone, video, e-commerce, and others) (Veligura, 2020). Telecommunication companies are generally infrastructure companies, data transmission technology, and communication facilities such as Internet Service Providers (ISPs), broadcasting (Radio and Television), cell phones, landlines, microwaves, etc. have helped many parties by supporting and facilitating information sharing platforms so that it has become an important industry around the world (Shoukat & Matriano, 2022).

The telecommunications sector has experienced a process of rapid development through the course of a long history. The development of telecommunications is marked by tremendous technological advances over the past few decades through mobility technology, broadband, and internet services that reach all over the world (Veligura, 2020). In response to the pandemic, the development of the telecommunications sector helped accelerate digital transformation around the world so that the importance of data, cloud computing, cybersecurity, blockchain, IoT, AI, automation, and many other new technologies has never been felt before (Khan, 2022). During the COVID-19 pandemic, several new technologies such as Artificial Intelligence (AI), Telecommunication Technology (TT), Big Data Analytics (BDA), 3D Printing Technology (3DPT), and High-Performance Computing (HPC) were created and used to reduce the consequences of disease, to optimize efforts against COVID-19, and to find a cure or vaccine as quickly as possible that could treat and cure COVID-19 patients around the world (Nascimento, Erick Giovanni Sperandio, and Badaro, 2020). Telecommunication technology and information technology to date have experienced a significant global surge in terms of their utilization in the fields of work, online education, entertainment, and other fields (Mulyono, 2023).

The telecommunications sector has an important role for the development of other economic sectors. Companies in the technology and telecommunications industries are key providers of connectivity and productivity services to support people's online activities, including business and education activities during the pandemic (Khan, 2021; Mulyono, 2023). The telecommunications sector is a major part of the business structure worldwide due to the huge potential of the telecommunications sector and its influence on other industries in providing extensive convenience and facilitation in sharing information, data, knowledge and media for all kinds of purposes (Shoukat & Matriano, 2022). Any disruption or problem that afflicts the telecommunications sector at the national or international level can result in major problems for other sectors integrated with the telecommunications system (Shoukat & Matriano, 2022).

In the midst of the COVID-19 pandemic, the telecommunications sector has a golden opportunity to get out of the crisis faster and rebuild its industry to be more advanced. The COVID-19 pandemic has put the telecommunications industry in a unique situation as it is able to provide a positive record of income opportunities for the telecommunications industry with

a surge in demand for internet from households to serve the needs of people working from home, video conferencing, e-learning, online shopping, cloud services, managed solutions, cybersecurity services, and wholesale bandwidth and consuming over-the-top (OTT) media (PwC, 2020). The telecommunications sector surprisingly managed to gain or benefit unexpectedly from the COVID-19 pandemic as their market grew due to the move of almost all industries and sectors to virtual platforms as a consequence of travel restrictions and lockdown policies (Shoukat & Matriano, 2022). In stark contrast to many other industries, the telecommunications sector in general is exempt from key COVID-19 pandemic-related restrictions such as stay-at-home orders and quarantine requirements thus benefiting from a surge in data & voice traffic, and increased use of broadband services resulting in better performance compared to other sectors (Veligura, 2020).

3. Research Methods

This research is a type of quantitative research using a comparative analysis approach. The research variables used in this study are variables of the company's financial performance. The financial performance to be examined is the financial performance of telecommunications sector companies, before the Covid-19 pandemic (2018-2019) and during the Covid-19 pandemic (2020-2021). The financial performance variables of telecommunications sector companies will be measured using five company financial performance indicators, namely liquidity indicators, *leverage* indicators, activity indicators, profitability indicators, and growth indicators. Each of these indicators will be indicated by ratio numbers, namely the current ratio, total debt to total assets (*debt ratio*), total *asset turnover*, return on assets (*ROA*), and sales growth ratio.

The population in this study is telecommunications sector companies listed on the Indonesia Stock Exchange (IDX) which amounts to 20 telecommunications sector companies. The sample in this study is telecommunications sector companies listed on the Indonesia Stock Exchange (IDX) and have published their financial statements in 2018-2021. The sample consisted of 13 telecommunications sector companies. The criteria set for sampling are: 1). Telecommunication sector companies listed on the Indonesia Stock Exchange (IDX) in the 2018-2021 period. 2). Telecommunications sector companies that have published their financial statements consecutively in the 2018-2021 period. The data used in this study is secondary data in the form of financial statements of telecommunications companies for 2018-2021 obtained from the Indonesia Stock Exchange (www.idx.co.id) website and the official website of each company. The data is financial performance data before the Covid-19 pandemic (2018-2019) and during the Covid-19 pandemic (2020-2021). The data is then processed and taken the average financial performance before and during the Covid-19 pandemic.

The data analysis method used in this study is an analysis method using MANOVA (*Multivariate Analysis of Variance*). MANOVA is a statistical test used to measure the influence of independent variables on a categorical scale on several dependent variables on a quantitative data scale (Ghozali, 2019). Data analysis is carried out with the help of analysis tools in the form of SPSS (*Statistical Product and Service Solutions*) software. The MANOVA analysis process is through the process of descriptive statistical analysis, multivariate normality test, simultaneous variance-covariance matrix homogeneity test, variance homogeneity test for each variable, simultaneous comparison test (multivariate), and separate comparison test (univariate).

4. Research Findings and Discussion

4.1 Descriptive Statistics

There are five financial performance ratios used as a measuring tool in this study. The ratios used are the *current ratio*, total debt to total assets ratio, total *asset turnover*, return on

total *assets* (ROA), and sales growth ratio of telecommunications sector companies listed on the Indonesia Stock Exchange (IDX) and have published their financial statements in 2018-2021. Based on the table below, it can be seen that many samples in all (N) consist of 12 companies. The average value of the current ratio before the Covid-19 pandemic was 1.8681, while the average value of the *current ratio* during the Covid-19 pandemic was 1.9647. The debt ratio before the Covid-19 pandemic had an average value of 0.5055, while the average debt *ratio* during the Covid-19 pandemic was 0.5391. The average value of *total asset turnover* before the Covid-19 pandemic was 0.3570, while during the Covid-19 pandemic it was 0.3270. ROA (*return on total assets*) before the Covid-19 pandemic had an average value of 0.0158, while during the Covid-19 pandemic it was 0.0517. The average value of the sales growth ratio before the Covid-19 pandemic was 0.0877, while during the Covid-19 pandemic it was 0.0946.

Descriptive Statistics				
	Covid-19	Mean	Std. Deviation	N
Current Ratio	BEFORE	1.8681	2.51872	12
	DURING	1.9647	3.10215	12
	Total	1.9164	2.76387	24
Debt Ratio	BEFORE	.5055	.24836	12
	DURING	.5391	.24300	12
	Total	.5223	.24090	24
Total Asset Turnover	BEFORE	.3570	.22173	12
	DURING	.3270	.19452	12
	Total	.3420	.20456	24
ROA	BEFORE	.0158	.09190	12
	DURING	.0517	.05459	12
	Total	.0338	.07617	24
Sales Growth	BEFORE	.0877	.15726	12
	DURING	.0946	.08496	12
	Total	.0911	.12366	24

Table 2 Comparison of Average Financial Performance Ratios

Indicators Financial Performance	Average Ratio		Information
	Before the Covid Pandemic-19	During the Covid-19 Pandemic	
Liquidity (<i>Current Ratio</i>)	1.86	1.96	The average value of liquidity indicators (<i>current ratio</i>) during the Covid-19 pandemic is better

			than the average value before the Covid-19 pandemic.
Leverage (Debt Ratio)	0.50	0.53	The average value of the leverage indicator (debt ratio) during the Covid-19 pandemic is better than the average value before the Covid-19 pandemic.
Activity (Total Asset Turnover)	0.35	0.32	The average value of activity indicators (total asset turnover) before the Covid-19 pandemic was better than the average value during the Covid-19 pandemic.
Profitability (ROA)	0.01	0.05	The average value of profitability indicators (ROA) during the Covid-19 pandemic is better than the average value before the Covid-19 pandemic.
Growth (Sales Growth)	0.08	0.09	The average value of growth indicators (sales growth) during the Covid-19 pandemic is better than the average value before the Covid-19 pandemic.

4.2 Multivariate Normality Test

A multivariate normality test is performed to determine whether the data is normally or abnormally distributed in a multivariate manner. Multivariate normality tests with SPSS are performed by determining the mahalanobis distance from the data used, then calculating the *chi square* value, and creating a *scatter plot* between the two. If the *scatter plot* tends to form a straight line and more than 50% of the mahalanobis distance value is less than or equal to *chi square*, then H_0 is accepted and means that the data is multivariate normal distributed. From the graph above, it can be seen that the distribution of data in the *scatter plot* tends to form a straight line. More than 50% of the mahalanobis distance value is less than or equal to the *chi square* value and is linearly patterned, so the data are multivariate normal distribution.

In addition to looking at the results of the *scatter plot*, the relationship between variables can also be seen by calculating the *Pearson* correlation value between the mahalanobis distance and *chi square*. If the *Pearson* correlation value is close to 1, the stronger the relationship between these variables. If the stronger the relationship between variables, then it can be said that the data is multivariate normal distribution. Based on the table above, it can be seen that the value of *Pearson's* correlation between the mahalanobis distance and *chi square* is 0.982,

the value is close to number 1, so there is a strong relationship between the mahalanobis distance and *chi square*. Therefore, it can be said that the data are normally multivariate distributed. If the multivariate normality assumption is met, it can be continued by conducting a MANOVA analysis.

Table 3 Correlation Test

Correlations		Mahala nobis Distance	qi
Mahalanobis Distance	Pearson Correlation	1	.982**
	Sig. (2-tailed)		.000
	N	24	24
qi	Pearson Correlation	.982**	1
	Sig. (2-tailed)	.000	
	N	24	24

** . Correlation is significant at the 0.01 level (2-tailed).

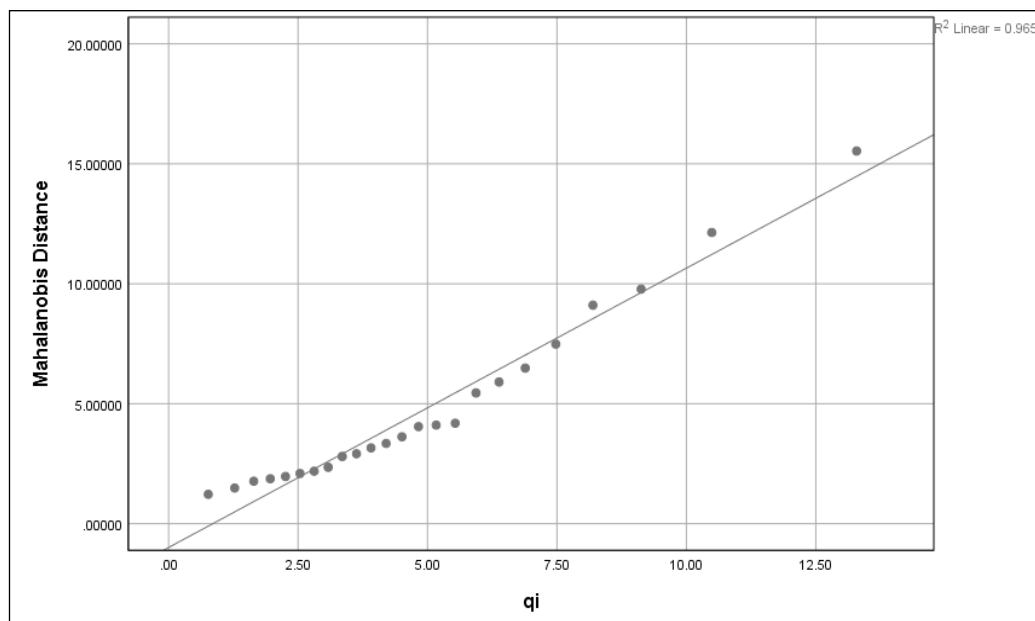


Figure 1 Scatter Plot

4.3 Uji Homogeneity of Variance-Covariance Matrix Simultaneously

The variance-covariance matrix homogeneity test is a prerequisite test before performing the MANOVA assumption test. This test is conducted to determine whether the matrix of variances of the dependent variables (current ratio, total debt to total assets, total *asset turnover*, return on total assets/ROA, and sales growth) is simultaneously the same before the Covid-19 pandemic and during the Covid-19 pandemic. Based on the table above, it can be seen that the

value of Box's M is 22.620 with a significance number of 0.322. The significance number is greater than 0.05, hence Ho is accepted. That is, the matrix of variances of dependent variables (current *ratio*, total debt to total assets, total asset *turnover*, return on total *assets*/ROA, and sales growth) was simultaneously the same before the Covid-19 pandemic and during the Covid-19 pandemic.

Box's Test of Equality of Covariance Matrices^a	
Box's M	22.620
F	1.131
df1	15
df2	1948.737
Sig.	.322
Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.	
a. Design: Intercept + Covid-19	

4.4 Test the homogeneity of the variance of each variable

The variance homogeneity test is performed using *Levene's Test*. This test was conducted to test the equivalence of variants in several populations individually between before and during the Covid-19 pandemic. Based on the table above, when viewed in the row *based on the mean* of each variable, it can be seen the significance value of each variable. The variable *current ratio* has a significance value of 0.860, *debt ratio* of 0.986, *total asset turnover* of 0.662, ROA of 0.295, and sales growth of 0.165. The significance value of all five variables is greater than 0.05, hence Ho is accepted. That is, the dependent variables (current *ratio*, total debt to total assets, total *asset turnover*, return on total *assets*/ROA, and sales growth) individually have the same matrix of covariances before the Covid-19 pandemic and during the Covid-19 pandemic.

Levene's Test of Equality of Error Variances^a					
		Levene Statistic	df1	df2	Sig.
<i>Current Ratio</i>	Based on Mean	.032	1	22	.860
	Based on Median	.012	1	22	.914
	Based on Median and with adjusted df	.012	1	21.072	.914
	Based on trimmed mean	.030	1	22	.863
<i>Debt Ratio</i>	Based on Mean	.000	1	22	.986
	Based on Median	.001	1	22	.972
	Based on Median and with adjusted df	.001	1	21.938	.972

	Based on trimmed mean	.000	1	22	.995
Total Asset Turnover	Based on Mean	.197	1	22	.662
	Based on Median	.234	1	22	.633
	Based on Median and with adjusted df	.234	1	21.994	.633
	Based on trimmed mean	.223	1	22	.641
ROA	Based on Mean	1.150	1	22	.295
	Based on Median	1.329	1	22	.261
	Based on Median and with adjusted df	1.329	1	19.137	.263
	Based on trimmed mean	1.186	1	22	.288
Pertumbuhan Penjualan	Based on Mean	2.065	1	22	.165
	Based on Median	2.088	1	22	.163
	Based on Median and with adjusted df	2.088	1	16.557	.167
	Based on trimmed mean	2.072	1	22	.164
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.					
a. Design: Intercept + Covid-19					

4.5 Simultaneous Comparison Test (Multivariate)

In this study, a multivariate test was conducted to see whether there were significant changes in the company's financial performance simultaneously based on financial ratios (*current ratio*, total debt to total assets, total *asset turnover*, return on total assets/ROA, and sales growth) in the pre-Covid-19 pandemic and during the Covid-19 pandemic. Based on the table above, when viewed in the Covid-19 row, the significance value tested with Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root shows the same significance number, which is 0.671 and shows the same F value, which is 0.642. In the test results, the significance value is greater than 0.05, it can be concluded that there is no significant difference in the financial performance of telecommunications companies simultaneously based on financial ratios before the Covid-19 pandemic and during the Covid-19 pandemic.

Table 6 Multivariate Test

Multivariate Tests^a						
Effect		Value	F	Hypothesis df	Error df	Sig.
Inter cept	Pillai's Trace	.979	169.066 ^b	5.000	18.000	.000
	Wilks' Lambda	.021	169.066 ^b	5.000	18.000	.000

	Hotelling's Trace	46.963	169.066 ^b	5.000	18.000	.000
	Roy's Largest Root	46.963	169.066 ^b	5.000	18.000	.000
Covid-19	Pillai's Trace	.151	.642 ^b	5.000	18.000	.671
	Wilks' Lambda	.849	.642 ^b	5.000	18.000	.671
	Hotelling's Trace	.178	.642 ^b	5.000	18.000	.671
	Roy's Largest Root	.178	.642 ^b	5.000	18.000	.671
a. Design: Intercept + Covid-19						
b. Exact statistic						

4.6 Separate Comparison Test (Univariate)

The univariate test was conducted to see if there were significant differences in the financial performance of telecommunications companies separately based on financial ratios before the Covid-19 pandemic and during the Covid-19 pandemic. Univariate test results can be seen in the *Test of Between-Subject Effect* table. Based on the table above, when viewed in the Covid-19 row, the significance value of each dependent variable, namely *the current ratio* variable (0.934), *debt ratio* (0.741), *total asset turnover* (0.728), *ROA* (0.256), and *sales growth* (0.895). The significance value of the five variables is greater than 0.05, then in each variable (*current ratio*, *total debt to total assets*, *total asset turnover*, *return on total assets/ROA*, and *sales growth*) there is no significant difference in the financial performance of telecommunications companies which is calculated separately based on financial ratios in the pre-Covid-19 pandemic period and during the Covid-19 pandemic.

Table 7 Test of Between-Subjects Effects

Tests of Between-Subjects Effects							
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	
Corrected Model	<i>Current Ratio</i>	.056 ^a	1	.056	.007	.934	
	<i>Debt Ratio</i>	.007 ^b	1	.007	.112	.741	
	<i>Total Asset Turnover</i>	.005 ^c	1	.005	.124	.728	
	ROA	.008 ^d	1	.008	1.358	.256	
	Sales Growth	.000 ^e	1	.000	.018	.895	
Intercept	<i>Current Ratio</i>	88.143	1	88.143	11.04	.003	
	<i>Debt Ratio</i>	6.548	1	6.548	108.4	.000	
	<i>Total Asset Turnover</i>	2.807	1	2.807	64.53	.000	
	ROA	.027	1	.027	4.789	.040	

	Sales Growth	.199	1	.199	12.47	.002
Covid-19	<i>Current Ratio</i>	.056	1	.056	.007	.934
	<i>Debt Ratio</i>	.007	1	.007	.112	.741
	<i>Total Asset Turnover</i>	.005	1	.005	.124	.728
	ROA	.008	1	.008	1.358	.256
	Sales Growth	.000	1	.000	.018	.895
Error	<i>Current Ratio</i>	175.640	22	7.984		
	<i>Debt Ratio</i>	1.328	22	.060		
	<i>Total Asset Turnover</i>	.957	22	.044		
	ROA	.126	22	.006		
	Sales Growth	.351	22	.016		
Total	<i>Current Ratio</i>	263.839	24			
	<i>Debt Ratio</i>	7.883	24			
	<i>Total Asset Turnover</i>	3.770	24			
	ROA	.161	24			
	Sales Growth	.551	24			
Corrected Total	<i>Current Ratio</i>	175.696	23			
	<i>Debt Ratio</i>	1.335	23			
	<i>Total Asset Turnover</i>	.962	23			
	ROA	.133	23			
	Sales Growth	.352	23			
a. R Squared = ,000 (Adjusted R Squared = -,045)						
b. R Squared = ,005 (Adjusted R Squared = -,040)						
c. R Squared = ,006 (Adjusted R Squared = -,040)						
d. R Squared = ,058 (Adjusted R Squared = ,015)						
e. R Squared = ,001 (Adjusted R Squared = -,045)						

4.7 Comparison of Research Results

There are similarities between the results of this study and previous studies. According to research on telecommunications companies listed on the Indonesia Stock Exchange also shows that there is no significant difference in financial performance in profitability indicators (return on total assets / ROA) between before and during the Covid-19 pandemic (Ananda Widiastuti, 2022). Research by (Febriani et al., 2022) on telecommunications companies listed on the Indonesia Stock Exchange also shows that there is no significant difference in financial performance in liquidity indicators (current ratio) and activity indicators (total asset turnover)

between before and during the Covid-19 pandemic. This indicates that telecommunications sector companies are able to survive in the face of the crisis that occurred during the Covid-19 pandemic.

5. Conclusion

Multivariately, it is concluded that there is no significant difference in the financial performance of telecommunications companies simultaneously based on financial ratios before the Covid-19 pandemic and during the Covid-19 pandemic. Univariately, it is concluded that in each variable (current ratio, total debt to total assets, total asset turnover, return on total assets, and sales growth) there is no significant difference in the financial performance of telecommunications companies which is calculated separately based on financial ratios before the Covid-19 pandemic and during the Covid-19 pandemic.

Furthermore, suggestions that can be given based on the results of this study focus on the government and telecommunications companies. The government should encourage the formation of policies that support the stability of the telecommunications sector after the pandemic, such as fiscal incentive support or other support that can encourage the growth of the telecommunications industry in the future. Telecommunications companies in Indonesia should focus more on diversification and innovation strategies to deal with economic uncertainties that may occur such as during the pandemic, including investment in new technologies and more adaptive business models so as to further improve operational efficiency and provide better services to customers.

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