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THE IMPLICATION OF COVID-19 ON TECHNOLOGY-BASED CORPORATE PERFORMANCE

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ABSTRACT

The purpose of this research is to find out the implications of COVID-19 on the performance of technology-based corporations. The research was conducted using a quantitative approach with panel data as a combination of time series and cross section data. The analysis used consisted of a paired difference test (t-test), and multiple regression which was carried out using a panel data approach. This research uses various Technology Sector companies in Indonesia that are listed on the IDX from 2019 – 2021 as the population. Determination of the sample is done by purposive sampling method. The Technology Sector companies that were used as research samples in this study totaled 10 companies that were listed on the IDX from 2019 to 2021. In this study, the tests were carried out using the Paired-samples T-Test. The regression model used is the chow test, lagrange multiplier test, and hausman test to determine one of the common effect models, fixed effect models, and random effect models. The results of the analysis show that of the independent variables tested, simultaneously the Variables COVID-19, Company Age, Company Size, Company Growth and Company Leverage Level can explain 71.9% of the NPM value or company performance, then 28.1% other influenced by variables outside this study.

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1. INTRODUCTION

The outbreak of Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) began in December 2019 in Wuhan, Hubei, China which caused Coronavirus Disease 2019 (COVID-19) with a total of at least 266 cases as of December 31 2019 (Santoso, 2021). In early to mid-January 2020, COVID-19 has spread to other provinces in China mainly due to the celebration of the Chinese New Year and Wuhan is a transportation hub and a major rail interchange place in China (Roosdiana, 2021). On January 30 2020, there were 7,818 confirmed positive cases of COVID-19 in China and since then many other countries have begun to confirm cases of COVID-19 that have appeared in their countries (Saputro & Hapsari, 2022). WHO on March 11 2020, has declared COVID-19 to be a pandemic and COVID cases worldwide have touched 100,000 cases and this number continues to increase rapidly to touch one million cases in April 2020 (Swiss German University, 2020). As of May 2022, more than 521 million positive cases of COVID-19 have been confirmed in all corners of the world with approximately 6.26 million deaths making this pandemic one of the deadliest events that has never happened in the world (Pristy, 2022).

On March 2 2020 and April 9 2020 located in Depok, West Java, for the first time in Indonesia, patients who tested positive for COVID-19 appeared, the pandemic has spread to all regions of Indonesia with the highest positive number of COVID-19 reported in DKI Jakarta, Central Java , and West Java (Ovid, 2021). As of May 2022, Indonesia has had at least 6 million positive cases of COVID-19 with more than 150,000 deaths (Goddess & Kencana, 2022). Given how this pandemic spread quickly and caused many fatalities, when the COVID-19 pandemic occurred, the majority of countries in the world implemented strict health protocols to prevent, or at least reduce the transmission rate of the SARS-CoV-2 virus, such as conducting social distancing. distancing (maintaining distance, doing activities from home, such as working to worship), lockdown efforts, regional quarantine, to the implementation of the PSBB (Pratama et al., 2021).

The implementation of social distancing, lockdown efforts, regional quarantine, and PSBB has led to a new work pattern, namely Work from Home (LaBerge, 2020). This work pattern arises due to distance restrictions, lockdowns, and similar health protocols (Kusmayadi et al., 2021). Public areas, especially offices that cannot accommodate as many people as before with the distance determined by the

distance restriction provisions (Firmansyah, 2021). In countries that impose regional lockdowns, people cannot go to work while essential and critical sectors must still be fully operational to maintain the stability of the country (Esomar & Christianty, 2021). In Indonesia, for example, there are 12 critical sectors that must operate even though there is a PSBB namely Health, Security and Public Order, National Vital Objects, National Strategic Projects, Construction, Energy, Disaster Management, Food and Beverage and Support, Logistics, Fertilizers and Petrochemicals, Cement and Building Materials, Transportation, Basic Utilities. These sectors are required to remain fully operational especially in production/service/construction facilities (Lubis, 2017).

With the need to continue operating, while there are health protocol provisions that need to be met, it is necessary to make adjustments in work patterns so that these needs are met. Therefore, the Work From Home or Remote Working pattern has begun to be implemented in Indonesia and many other countries around the world. Apart from the critical and essential sectors, the Work From Home work pattern has also begun to be implemented by other business actors around the world (Diskominfo Kotawaringin Barat, 2022). The Work From Home or Remote Working pattern is not a new work pattern, but its effectiveness in its application is used so it is not used in general. However, because Work From Home is one of the best options so that business operations and essential sectors continue to run well, many companies are starting to adapt and implement this Work From Home work pattern. The transition from the Work From Office work pattern to Work From Home is certainly not an easy thing, it requires technologies that can support Work From Home to run smoothly. Implementing Work From Home requires supporting technologies such as Laptops, Internet, Collaboration Applications, Virtual Communication Applications, Virtual Storage Applications, and other technologies according to the needs of the ongoing business (Butarbutar, 2021).

In addition to creating Work From Home or Remote Working patterns, the implementation of social distancing health protocols, lockdown efforts, regional quarantine, and Large-Scale Social Restrictions (PSBB) have also changed the way of life for many people, such as online teaching and learning activities, shopping for necessities online. online, to online gathering. Although not yet used by everyone, the options for working, shopping, studying and socializing online are being adapted by people all over the world. Developments and improvements to infrastructure, features and services are also continuously carried out to support the ease of doing activities online. According to a survey conducted by LaBerge, L., et al (2020) with respondents consisting of several company executives spread across the world, during the COVID-19 pandemic, consumption activities drastically shifted through digital platforms, and companies responding to these actions by developing customer interactions through digital platforms as well. From the survey, it was also known that 80% of the survey respondents preferred to interact digitally. Therefore, many companies are starting to develop digital products and services, especially companies that offer health and pharmaceutical products, banking services, and professional services (LaBerge, 2020).

In line with the survey results above, research conducted by Adiningsih, S. (2021), the occurrence of the COVID-19 pandemic in Indonesia resulted in an increase in unemployment and poverty rates. However, the COVID-19 pandemic has accelerated digital transformation, especially on e-commerce platforms and fintech companies in Indonesia. According to the research, micro-enterprises and manufacturing sector companies in Indonesia have increased their adoption of digital platforms by 59%. This is because COVID-19 has driven changes in the behavior of consumers and business people in their consumption and business activities. This research also predicts that there are four sectors that will be in great demand to be developed digitally, namely the education, health, digital financial sector, and e-commerce sectors (Pristy, 2022).

The acceleration of technology adoption also occurs in companies in the United States, especially companies in the technology sector. According to (Amalia et al., 2021), in Q1 2021, sales of Amazon, one of the largest e-commerce companies in United States, has increased by 44% compared to last year's sales. Amazon has also posted a profit of US$8.1 billion in the first quarter of 2021, which is a 220% increase from its profit in the same quarter in 2020. This is an increase in the number of purchases on household products such as toilet paper and other household products. health products to prevent and treat COVID-19 such as masks, disinfectants, and medicines (Swiss German University, 2020).

Apart from Amazon, Microsoft's sales, which is a technology company that offers supporting applications for offices, also rose during the COVID-19 pandemic. Demand for cloud-computing services and Office Suite such as e-mail has increased due to the large number of Work From Home implementations taking place in the United States. The cloud-computing segment recorded a profit of USD

15.1 billion in Q1 2021 or an increase of 23% compared to the same quarter in 2020. Meanwhile, the Office Suite segment recorded a profit of USD 13.6 billion or an increase of 15% compared to the previous quarter. the same in 2020. Meanwhile in Indonesia, PT Anabatic Technologies Tbk., which is engaged in IT system consulting, integration and management, recorded an increase in sales in 2021 to 6.45 trillion rupiah, an increase of 16.35% compared to its sales in 2019 before COVID -19 hit Indonesia (Badan Kebijakan Fiskal, 2021). Apart from PT Anabatic Technologies Tbk, PT NFC Indonesia Tbk. which is engaged in information technology, digital and telecommunications services, recorded an increase in sales in 2021 to 8.88 trillion rupiah, an increase of 44.4% compared to its sales in 2019 before COVID-19 hit Indonesia.

In addition to increasing the income of technology companies in Indonesia, during the COVID-19 pandemic, it was noted that there were an additional 14 technology companies registering on the Indonesia Stock Exchange. 4 Technology Companies joining in 2020, 7 in 2021, and 3 in 2022, including Bukalapak and Goto. The addition of 14 technology companies in the past 3 years shows an increase in businesses engaged in technology, because previously in 2018 there were only 18 technology sector companies listed on the Indonesia Stock Exchange. The rapid and massive increase in technology absorption, especially based on the emergence of the COVID-19 pandemic, motivated the author to conduct research on the implications of COVID-19 for the performance of technology-based corporations to see a comparison of the performance of technology sector companies before and after the COVID-19 pandemic in Indonesia. The purpose of this research is to find out the implication of COVID-19 on the performance of technology-based corporations.

2. METHOD

The research was conducted using a quantitative approach with panel data as a combination of time series and cross section data. The analysis used consisted of a paired difference test (t-test), and multiple regression which was carried out using a panel data approach. This research uses various Technology Sector companies in Indonesia that are listed on the IDX from 2019 – 2021 as the population. Determination of the sample is done by purposive sampling method. Financial report data is downloaded from the official website of the IDX (Indonesian Stock Exchange IDX), namely https://www.idx.co.id/enterprise-tercatat/report-keuangan-dan-tahunan/(IDX, 2022). The Technology Sector companies that were used as research samples in this study totaled 10 companies that have been listed on the IDX from 2019 to 2021 consisting ofGalva Technologies Tbk., Kioson Komersial Indonesia Tbk., Kresna Graha Investama Tbk., Sentral Mitra Informatika Tbk., M Cash Integrasi Tbk., Multipolar Technology Tbk., Metrodata Electronics Tbk., NFC Indonesia Tbk., Sat Nusapersada Tbk, Telefast Indonesia Tbk.In this study, the tests were carried out using the Paired-samples T-Test. This study selected the best model as an estimation method for the panel data regression model. The regression model used is the chow test, lagrange multiplier test, and hausman test to determine one of the common effect models, fixed effect models, and random effect models.

3. RESULT AND DISCUSSION

Descriptive Analysis

The research "Implications of COVID-19 on the Performance of Technology-Based Corporations" will be explained using a descriptive statistical approach to the company's performance variable, namely Net Profit Margin (NPM).

Table 1. Table of Descriptive Analysis

Variable	Observations	Means	std. Dev.	Min	Max
Performance (NPM)	30	0.017	0.029	-0.045	0.086
COVID19	30	0.666	0.479	0	1
LEVERAGE	30	1,269	0.977	0.220	4,647
SIZE	30	0.000	0.000	0.000	0.000
GROWTH	30	0.189	0.558	-0.578	2,028
AGE	20	21.5	14,516	4	46

The data collected were 10 Technology Sector companies listed on the IDX for the period 2019 to 2021 so that a total of 30 data observations were collected. The table above shows descriptive statistics with STATA processing which includes the mean, standard deviation, minimum, and maximum values.

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To measure company performance, the authors useThe Profitability Ratio is explained by the NPM value for Technology Sector companies on the IDX from 2019 to 2021, the following table contains data obtained from the financial reports of each company:

Table 2. Net Profit MarginsTechnology Sector Companies on the IDX in 2019 to 2021

Company name	2019	2020	2021
Galva Technologies Tbk.	3.49	3,15	2,27
Kioson Commercial Indonesia Tbk.	-0.18	-4.56	0.74
Kresna Graha Investama Tbk.	1.86	-2.76	-3.70
Central Partners Informatics Tbk.	5,24	-2.92	0.31
M Cash Integration Tbk.	1.37	0.23	0.50
Multipolar Technology Tbk.	5.59	6,42	8.65
Metrodata Electronics Tbk.	2.37	2.60	2.75
NFC Indonesia Tbk.	0.58	0.32	1.82
Sat Nusapersada Tbk	0.27	3,33	3.64
Telefast Indonesia Tbk.	2.84	1.14	4,13

The table shows that the Net Profit Margin of the 10 sample companies fluctuates quite a bit from year to year and has a different amount for each company. Companies that consistently have an increasing Net Profit Margin are Multipolar Technology Tbk., Metrodata Electronics Tbk., and Sat Nusapersada Tbk.

The Impact of the Covid-19 Pandemic on the Financial Performance of Technology Sector Companies Listed on the IDX

Paired Difference Test

In this research, the measurement of financial performance variables is carried out by using the profitability ratio which is represented by the NPM value (called 'performance'). Furthermore, a pair different test (t test, parametric statistics) was carried out with data divided into 2 groups, namely the 2019 Net Profit Margin data as a performance indicator before the COVID-19 pandemic and 2021 Net Profit Margin data as a performance indicator after the COVID pandemic. -19. The results of the analysis are shown in the table below.

Table 3. Paired Difference Test

	Statistics	P-values
2019 Performance - 2021 Performance	0.2427	0.0813

The provisions used in the paired t test are:

1. If the p-value is > 0.05, it means that you accept Ho or reject Ha, so there is no difference in the mean 2019 Performance and 2021 Performance.
2. If the p-value is <0.05, it means that Ho is rejected or Ha is accepted, so there is a mean difference between the 2019 performance and the 2021 performance.

The data above shows that if the p-value is 0.0813 > 0.05, this means that there is no difference in mean performance before and after the COVID-19 pandemic.

Panel Data Regression

Panel data regression is a type of regression test that has its own characteristics, namely there is a combination of time series data and cross-sectional data. Thus, many also mention panel data regression with longitudinal regression. Panel data analysis is carried out by first selecting which determinant model is the best model. The analysis used in determining the regression model is carried out by the chow test, lagrange multiplier test, and hausman test to choose one of the common effect models, fixed effect models, and random effect models. The results of data processing using the common effect model, fixed effect model, and random effect model are as follows:

Table 4. Panel Data Regression

Variable	CEM	Sig	FEM	Sig	BRAKE	Sig
COVID19	-0.023	0.950	-0.005	0.950	0.075	0.062
LEVERAGE	-0.004	0.806	0.001	0.806	0.000	0969
SIZE	0.000	0.644	0.000	0.644	0.000	0.650
GROWTH	0.005	0.716	0.003	0.716	0.006	0.372
AGE	0.011	0.341	0.050	0.341	0.003	0.184
Constanta	-0.267	0.028	-1,042	0.269	-0.103	0.057
N	30		30		30	
R square	0.719		0.081		0.157	

F test	2.74	0.0311	1040	0.418	.	.
Chow test			0.161			
Hausman test			0.744			
Lagrange Multiplier test			0.181			
Best Models			*Common Effects Model*			

a. ChowTest

This test aims to compare the best model between the Common Effect Model and the Fixed Effect Model. The hypothesis in the chow test is:

H0 :*Common Effects Model*

H1 : Fixed Effect Models

Under the condition: If the significance value is > 0.05, it means that Ho is accepted, If the significance value is <0.05, it means that Ho is rejected

Table 5. Chow Test

Chow test	Significance
Prob > F	0.161

The results of the chow test are presented in table 11, showing the Sig. from Prob > F which is 0.161 (> 5%), which means Ho is accepted, so the Common Effect Model is the right model to use in panel data regression. Based on the results of the Chow test that has been carried out, it shows the results if the most appropriate model is used, namely the Common Effect Model.

b. Hausman test

This test aims to compare the best model between the Fixed Effect Model and the Random Effect Model. The hypothesis in the chow test is:

H0 :*Random Effects Model*

H1 : Fixed Effect Models

Under the condition: If the significance value is > 0.05, it means that Ho is accepted, If the significance value is <0.05, it means that Ho is rejected

Table 6. Hausman test

Hausman test	Significance
Prob > Chi2	0.744

The results of the chow test are presented in table 11, showing the Sig. from Prob > F which is 0.744 (> 5%), which means Ho is accepted, so the Random Effect Model is the right model to use in panel data regression.

c. Lagrange Multiplier Tes

This test aims to compare the best model between the Common Effect Model and the Random Effect Model.

The hypothesis in the Lagrange Multiplier Test is:

H0: Common Effect Models

H1: Random Effects Model

By criteria: If the value is sig. > 0.05 means accepting Ho, If the value is sig. < 0.05 means rejecting Ho

Table 7. Lagrange Multiplier Test

Lagrange test	Significance
Prob > Chi2	0.181

From the table, it can be seen that the Sig. from Prob > Chi2 which is 0.181 (> 0.05) which means accepting Ho, so that in estimating panel data regression it is more appropriate to use the Common Effect Model.

d. Common Effect Model Regression Estimation Results

From the results of the Chow Test, Hausman Test and Lagrange Multiplier Test above, it can be concluded that the estimation model is the best of the Common Effect Model. The regression results were carried out using the Common Effect Model, namely:

Table 8. Common Effect Models

Variable	coefficient	t-Statistics	Prob.
COVID19	-0.023	-1.00	0.333
LEVERAGE	-0.004	-0.64	0.533
SIZE	0.000	0.08	0.937
GROWTH	0.005	0.40	0.695

AGE	0.011	0.91	0.379
R-Squared	0.719		
F-Statistics	2.74		
Sig F-Statistics	0.031		

Simultaneous Effect Test (Test F)

The significance test can be seen in the Prob (F-statistic) value of the Common Effect Model table above with the hypothesis:

H0 : VariableCOVID-19 and Control Variables simultaneously have no significant effect on Company Performance Variables or Net Profit Margins

H1 : VariableCOVID-19 and Control Variables simultaneously have a significant effect on Company Performance Variables or Net Profit Margins.

With the provisions of decision making as follows:

If the significance value is > 0.05 then the VariableCOVID-19 and Control Variables simultaneously have no significant effect on Company Performance Variables or Net Profit Margins, If the significance value is <0.05 then the VariableCOVID-19 and Control Variables simultaneously have a significant effect on Company Performance Variables or Net Profit Margins. From the regression results using the Common Effect Model above, it can be seen that the probability of F is 0.031 <0.05, so that the variableCOVID-19 and Control Variables simultaneously have a significant effect on Company Performance Variables or Net Profit Margins.

Partial Effect Test (t test)

Partially testing the significance of the Independent Variable to the Dependent Variable can be seen in the P-Value of the VariableCOVID-19 in the Common Effect Model table above with the hypothesis:

H0 : VariableCOVID-19 partially does not significantly influence the Company Performance Variables or Net Profit Margin

H1 : VariableCOVID-19 partially has a significant effect on Company Performance Variables or Net Profit Margins.

With the provisions of decision making as follows: If the significance value is > 0.05 then the VariableCOVID-19 partially does not significantly influence the Company Performance Variables or Net Profit Margin, If the significance value is <0.05 then the Variable COVID-19 partially has a significant effect on Company Performance Variables or Net Profit Margins. From the regression results using the Common Effect Model above, it can be seen that the P-Value of the VariableCOVID-19 is 0.333 > 0.05, so that the COVID-19 variable partially has no significant effect on the Company Performance Variable or Net Profit Margin.

Coefficient of Determination R^2

From the regression results using the Common Effect Model above, the adjusted R-squared value is 0.719 which indicates that the Net Profit Margin value of 71.9% is explained by the VariableCOVID-19 and Control Variables, while the other 28.1% is explained by other factors outside the model.

Classic assumption test

a. Normality test

This test was carried out on the residual value of the regression model. In order to see the normality of a regression model in this study, a test was carried out*Shapiro wilk*. If the sig. Shapiro wilk test > 0.05 (α = 5%), this means that the regression model is normally distributed.

Table 9 . Normality test

p-values	Information
0.8845	Normal Distribution

The table shows if test*Shapiro wilk*has sig value. 0.8845. This value indicates that the significance value is > 0.05 so that it can be concluded that the regression model is normally distributed, which means that the provisions in the normality test have been fulfilled.

b. Multicollinearity Test

This test aims to determine whether there is a relationship between the independent variables in the regression model. One technique to determine whether there are symptoms of multicollinearity is to use tolerance and VIF values. The cut off value used to show symptoms of multicollinearity is tolerance > 0.1 or equal to VIF value < 10.

Table 10. Multicollinearity Test

Variable	VIF
COVID19	1.09
AGE	1.22
SIZE	1.20
GROWTH	1.14
LEVERAGE	1.01

Based on the table, it can be seen that the tolerance value of the independent variable has a value > 0.10. VIF value < 10. So if the independent variable regression model does not experience multicollinearity problems and is in accordance with the provisions in the multicollinearity test.

c. Heteroscedasticity Test

The purpose of this test is to find out whether all the variables used have homogeneous or heterogeneous variations. If the sig. independent variables with absolute residuals > 0.05 are declared not experiencing symptoms of heteroscedasticity.

Table 11. Heteroscedasticity Test

Variable	VIF
NPM	1.09
AGE	1.22
SIZE	1.20
GROWTH	1.14
LEVERAGE	1.01

The table shows the significance value of Net Profit Marfin, Company Age, Company Size, Company Growth, Company Leverage Level which is > 0.05. This means that there is no heteroscedasticity problem.

4. CONCLUSION

From the results of panel data regression using the Common Effect Model, it can be concluded that the variables COVID-19, company age, company size, company growth and company leverage level simultaneously have a significant effect on company performance. Meanwhile, the COVID-19 variable partially has no significant effect on company performance. The results of the analysis also show that of the independent variables tested, simultaneously the COVID-19 Variables, Company Age, Company Size, Company Growth and Company Leverage Level can explain 71.9% of the NPM value or company performance, then 28.1% others are influenced by variables outside of this study. In line with the results of this study, according to the author, the high number of technology companies listed on the Indonesia Stock Exchange during the COVID-19 pandemic indicates a demand for the products and services offered by these technology companies, so that policies that facilitate growth are needed. the growth of these technology companies so that companies in the Technology Sector can meet existing demands related to technology.

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