THE IMPACT OF COVID-19 ON LISTED COMPANIES IN THE ICT SECTOR

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Abstract: Due to the COVID-19, the business performance is declining. However, the rapid transition to the use of information and communication technology (ICT) has increased. This means that ICT sector had more opportunities during this period. Thus, this paper aims to study the performance of companies in Information & Communication Technology (ICT) in the Stock Exchange of Thailand (SET) from year 2017 to 2022) by using financial ratios as measurement. Various statistic parameters are generated such as Minimum, Maximum, Skewness, t-test of different mean, and trend analysis and linear regression. The results show that there exist signals of worse performance in both solvency and activeness of this industry. While the companies were getting worse in their liquidity from COVID-19, they significantly improved their profitability in terms of ROA.

Keywords: COVID-19, Financial Ratio Analysis (FRA), Information and Communication Technology (ICT).

I. INTRODUCTION

Business performance has been declining since the spread of COVID-19. The air travel industry would lose US$113 billion if the COVID-19 outbreak was not quickly contained. (IATA, 2020) The S&P 500 index lost over $5 trillion in value in the same week in the US while the S&P 500's largest 10 companies experienced a combined loss of over $1.4 trillion. (Reuter, 2020) However, Tropea & De Rango (2020) reported that information and communication technologies (ICT) could allow a better management of the pandemic and a faster recovery from the national crisis in Italy, where lockdown has strict implications for the society from an economical, mental-health and social points of view.

In addition, Davies (2021) found that the rapid transition to ICT-supported working from home arrangements will open more diverse employment opportunities for rural populations.Apparently, COVID-19 provided the opportunity for ICT to provide their support to the other businesses and earn good performances during the period. The objective of this paper, thus, is to study the impact of COVID-19 on the ICT sector under the technology industry.Gathering data from the Stock Exchange of Thailand, various statistics have been calculated, including 4 sets of financial ratios, minimum and maximum value of each ratio, and their skewness. The data are grouped into pre- and post- COVID-19 and test for different in their mean using T-test. Finally, the trend of each ratios are analyzed and represented in both numbers and graphics.The result shows that only liquidity ratios are statistically significantly decreased while the ROA is surprisingly increased after the spread of COVID in 2019.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Information and Communication Technology (ICT) in Stock Exchange of Thailand (SET)

ICT sector is a part of the technology industry of SET. There are 3 criteria of companies in this group, 1) ICT service providers such as satellite telecommunication and cable service providers, IT implementer, internet service providers, manufacturers and configurators; 2) mainframe system manufacturer and service providers; and 3) technology equipment, i.e., telecommunication devices, hardware, and computer parts, manufacturers or providers and software developers.

2.2. Financial Ratio Analysis

There are four categories of ratios used to analyze a firm's financial performance. They are liquidity ratio that describes the company's ability to meet short-term liabilities (debt), solvency ratio (leverage) that is used to measure the extent to which the company's assets are financed with debt, activity ratio that is used to measure the effectiveness of the company using its assets, and profitability ratio that is used to assess the company's ability to generate profits. (Devi, Warasniasih, Masdiantini, and Musmini, 2020; Fraser and Ormiston (2016; Fajriyanti, and Wiyarni, 2022)

1) Liquidity Ratios

The liquidity ratio measures the company's ability to pay obligations that are due within one year. The current ratio measures the company's ability to pay all current liabilities with all available current assets. The quick asset, however, ignores the inventory as it might take longer time to turn into cash for paying debt.

2)Solvency Ratios

The solvency ratio measures the company's ability to pay off all its obligations. These ratios are often used by business lenders. Debt-to-Asset measures the company's ability to pay all liabilities in the long term such as, but not limited to, when the company goes bankrupt. According to an accounting equation, the value of this ratio ranges from 0 and to less than 100. It can be considered as a percentage of debt or the percentage of risk, as a complementary to the owner.

On the other hand, all a company's assets belong to either their lenders or owners. While the owners received the uncertain returns as dividends, the lenders received the fixed returns as interest. Owners may not receive dividends according to the situation, but lenders must receive their interest on time. Consequently, having a higher debt will guarantee the returns to lenders and so lower the returns to owners. Debt-to-Equity, as a result, sometimes referred to the financial risk of owners. The balance number of this ratio is 1. The higher number refers to the more risk while the lower number refers to the more conservative.

3) Activity Ratios

The activity ratio measures the effectiveness of a company using its assets to generate sales. The more sales a company earns means the more reputation a company receives from its customer. However, customers will pay the company for either service or product so the sales of a company should be based on either their equipment, to provide the service, or products.

III. RESEARCH METHODOLOGY

The type of data collected in this study is secondary data. Data are collected from ICT sector in SET which is under technology industry for years of pre-COVID, 2017-2019, and post-COVID, 2020-2022 through the website. The last 3-year data is available at SET website while older ones on the SEC website. Next, each record is measured using four groups of financial ratios, i.e.

Type of Ratio	Name of Ratio
Liquidity Ratio	Current Ratio, Quick Ratio
Solvency Ratio	Debt Assets Ratio, Debt to Equity
Activity Ratio	Account Receivable Turnover, Fixed Assets Turnover
Profitability	Gross Profit Margin, Return on Equity, Return on Investment

Table 1: Financial Ratios

The result will be described by different types of statistics. Each type of ratio will be group based on year into pre (2017-2019) and post (2020-2022). The effect of COVID, between pre- and post- period, is calculated using t-test. After all, the trend analysis is Some businesses, however, only provide the service to the customer so their activity on products might not be available. As a result, the account receivable turnover is more applicable.

4) Profitability Ratios

The profitability ratio measures the company's ability to generate profits or measure the efficiency of the company. Although the activity ratio focuses on the usage of assets to generate sales, the ultimate return to company owners is the profit. The profit, however, is biased by the sales as more sales generated more benefits so the unbiased measurement used here is called Gross Profit Margin (GPM). With the same idea on asset and equity, the Return on Asset (RoA) and Return on Equity (RoE) are also selected as measurements of profitability ratios.

2.3. Hypothesis Development

In order to study the performance of ICT industry, the financial ratios are used as measurements. These hypotheses are based on each group of ratios.

Hypothesis 1: The financial liquidity of listed companies in the ICT sector is significantly increased after COVID-19.

Hypothesis 2: The solvency ratio of listed companies in the ICT sector is significantly decreased after COVID-19.

Hypothesis 3: The activity ratio of listed companies in the ICT sector is significantly increased after COVID-19.

Hypothesis 4: The profitability of listed companies in the ICT sector is significantly increased after COVID-19.

analyzed, by using simple linear regressions, to see whether there is a positive coefficient on the slope or not.

IV. RESULTS

As of December, 2022, there are 33 valid companies in the ICT sector. Out of these 33 companies, one company is an infrastructure, another company is 3 outliers from an additional investing in subsidiary and 7 companies entered after the year 2017 so there are only 22 companies remaining for this study.

	N
Total	33
LessInfrastructure	1
Less Late enter	7
Less Outlier	3
In this study	22

Table 2: Number of valid Companies

4.1. Extreme Point

As listed in Table 3, among 6 years, the minimum of current ratio is 0.27 in year 2022 while the maximum is 14.13 in year 2019. For the quick ratio, the minimum of the quick ratio is 0.17 in year 2018 while

the maximum is 11.00 in year 2017. The current ratio shows the best point before COVID-19 while the worst point is after COVID-19, however, the quick ratio hardly supports the same thing.

Ratio	2017	2018	2019	2020	2021	2022
Current	0.48	0.41	0.43	0.29	0.38	0.27
	3.43	1.75	2.62	1.64	2.43	1.49
	11.00	4.39	14.13	4.32	5.66	4.54
Quick	0.44	0.17	0.21	0.29	0.36	0.27
	3.48	1.93	1.96	2.00	2.72	1.91
	11.00	4.38	9.18	4.23	5.65	4.54
D/A (-)	0.10	0.09	0.13	0.20	0.19	0.12
	-0.87	-1.23	-1.07	-0.36	-0.25	-0.57
	0.82	0.80	0.76	0.95	0.94	0.96
D2E (-)	0.10	0.10	0.15	0.26	0.23	0.14
	3.71	1.01	0.54	4.09	4.16	4.43
	15.33	5.18	4.47	24.21	20.29	34.47
AR	0.13	0.19	0.14	0.90	1.69	1.78
	3.98	4.13	4.09	3.70	1.92	1.49
	39.86	39.84	35.39	22.71	14.99	11.64
Asset	0.08	0.11	0.09	0.19	0.19	0.19
	1.88	2.00	1.47	1.65	1.80	1.63
	3.92	3.69	3.08	3.63	3.29	2.96
GPM	-34.05	-31.70	-45.00	-16.21	-12.12	-14.13
	-0.48	-1.12	-1.30	-0.66	0.22	-0.66
	37.92	26.63	39.10	22.27	25.28	17.74
ROA	-8.37	-8.45	-8.19	-3.21	-3.93	-2.93
	-4.03	-0.74	0.85	-0.08	0.64	-0.54
	11.96	10.34	28.37	14.72	22.93	13.45
ROE	-18.31	-27.24	-18.65	-25.98	-35.94	-58.90
	1.27	0.22	0.42	-0.50	-0.50	-1.56
	64.59	54.98	49.20	37.88	48.26	40.81

Table 3:Minimum, Skewness and Maximum

For the solvency ratio, the minimum of debt over asset is 9% in year 2018 while the maximum of debt over asset is 96% in year 2022. On the other hand, the minimum of debt over equity is 0.10 in year 2018 while the maximum of debt over equity is 34.47 in year 2022.

For the activity ratio, the account receivable had at least 0.13 turnover in year 2017 while the account receivable had at most 39.86 turnover in the same year. The inventory had at least 0.08 turnover in year 2017 while the inventory had at most 3.92 turnover in the same year 2017. Apparently, the activity ratio, both account receivable and inventory are most varied in the year 2017.

For profitability ratio, the minimum ROA is -8.45 in year 2018 while the maximum ROA is 28.37 in year 2019. The minimum ROE is -58.90 in year 2022 while the maximum ROE is 64.59 in year 2017. Lastly, the minimum GPM is -45.00 in year 2019 while the maximum GPM is 39.10 in the same year. Apparently, the ROE shows the best point before COVID-19 while worst point after COVID-19, however, the other 2 ratios hardly support the same thing. GPM were most varied in year 2019.

4.2. The Scatter of Data

Skewness is a measurement of the asymmetry of distribution.

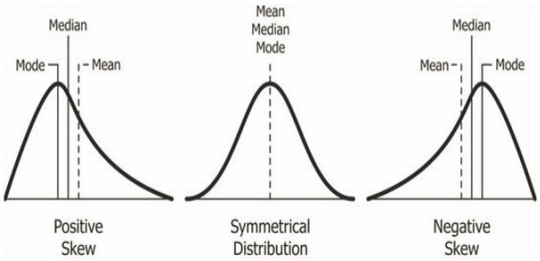

Figure 1: Shape of Skewness

Thus, an average ratio with negative data means more than 50% of companies in that year have a higher ratio than mean. For example, all liquidity ratios, both current ratio and quick ratio have a positive skewness in each year. This means that more than 50% of companies have liquidity less than mean.

For solvency ratio, however, the results are diverse. More than 50% of companies have higher risk than the average, as all debt-to-asset skewness is negative. However, more than 50% of companies have lower risk than average, as all D2E skewness are positive. These diverse results can be interpreted as most companies have a higher risk in the short term, but

they are more conservative in the long run. The skewness of all activity ratio is positive so more than 50% have less activities than mean. Interestingly, the profitability ratios have a variety of skewness as shown in Table 3. All ratios, except profitability, have a positive minimum. Most parameters are consistency in sign except the skewness of profitability ratio.

4.3. Test of Different Mean

In this section, performances in each year are grouped into 2 groups based on the year. The performance from years 2017-2019 will be grouped as before COVID-19 while the performance from years 2020-2022 will be grouped as after COVID-19.

Ratio	2017-2019 (Before)	2020-2022 (After)	Diff	p-value
Current	2.04 (2.41)	1.44 (0.98)	-	0.05 *
Quick	1.77 (2.04)	1.28 (0.98)	-	0.05 *
D/A	0.56 (0.18)	0.59 (0.18)	+	0.46
D2E	2.06 (2.09)	3.00 (5.44)	+	0.41
AR	6.11 (7.43)	5.33 (3.78)	-	0.42
Asset	1.00 (0.96)	0.95 (0.89)	-	0.38
GPM	4.90 (13.00)	5.36 (8.20)	+	0.86
ROA	4.86 (5.91)	6.62 (4.85)	+	0.07 *
ROE	11.35 (15.94)	9.20 (17.43)	-	0.58

Table 4: The Mean different of each ratio

Table 4 shows the mean and standard deviation of each ratio, grouped as before and after COVID-19. There are 4 ratios increased and 5 ratios decreased. Using t-test between means of each ratio, the p-value of each pair is calculated. The result shows that there are only 3 ratios significantly different. Current ratio and Quick ratio are significantly decreased while ROA is significantly increased.

4.4. Trend Analysis

In this section, the average performance and standard deviation are calculated in each year for trend analysis.

Ratio	2017	2018	2019	2020	2021	2022
Current	2.06 2.22	1.47 1.10	2.58 3.34	1.40 0.91	1.51 1.18	1.42 0.88
Quick	1.87 2.26	1.29 1.14	2.14 2.48	1.25 0.89	1.35 1.19	1.24 0.89
D/A (-)	0.55 0.18	0.58 0.18	0.57 0.18	0.59 0.19	0.57 0.18	0.59 0.19
D2E (-)	2.30 3.14	1.97 1.42	1.91 1.25	3.00 4.95	2.57 4.11	3.44 7.06
AR	6.30 7.88	6.08 7.84	5.95 6.86	5.49 5.43	5.22 2.94	5.27 2.48
Asset	1.04 1.08	0.97 0.99	0.98 0.85	0.96 0.91	0.98 0.97	0.92 0.82
GPM	5.07 13.04	4.82 11.56	4.81 14.82	5.80 8.04	5.86 8.62	4.41 8.23
ROA	3.97 5.12	3.51 5.10	7.09 6.93	6.70 4.51	7.26 5.64	5.91 4.45
ROE	11.08 16.72	10.16 17.50	12.82 14.04	10.49 13.97	10.90 17.13	6.19 20.91

Table 5: Average and Standard deviation

From Table 5, the trend line of each ratio is plotted as follows.

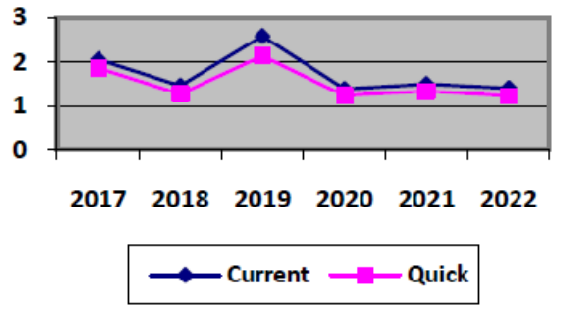

Figure 2: Trend of Liquidity ratio

Figure 2 shows the negative trendline which represents the worse performance of liquidity

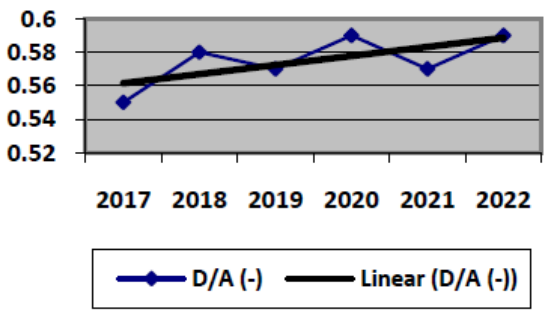

Figure 3: Trend of D/A ratio

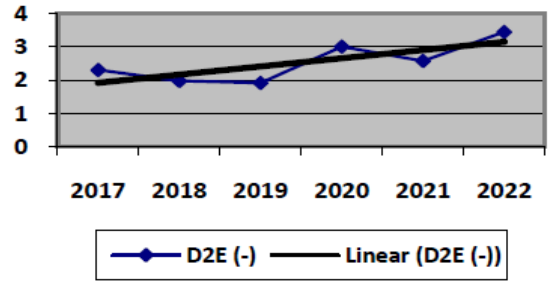

Figure 4: Trend of D2E ratio

Figure 3 and 4 show the positive trendline of both D/A and D2E ratios. Unfortunately, these ratios represent the leverage of the company which is higher ratio means the worst performance of the company.

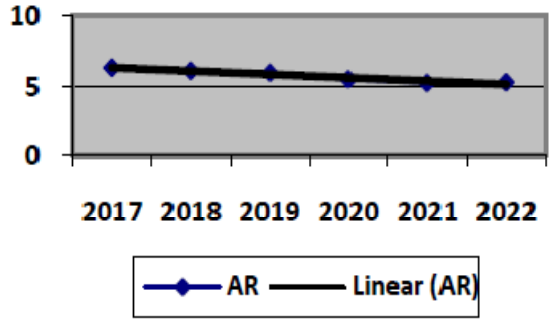

Figure 5: Trend of AR Turnover ratio

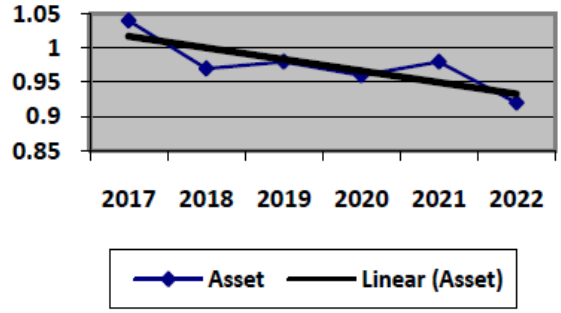

Figure 6: Trend of Asset Turnover ratio

Figure 5 and 6 show the trendline of turnover ratios. The higher value of this ratio represents the better performance of company. Unfortunately, both A/R turnover ratios and Asset turnover ratios are decreased over time so the performance of companies is decreased accordingly.

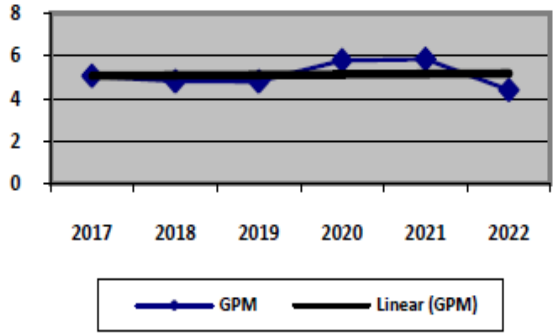

Figure 7: Trend of GPM ratio

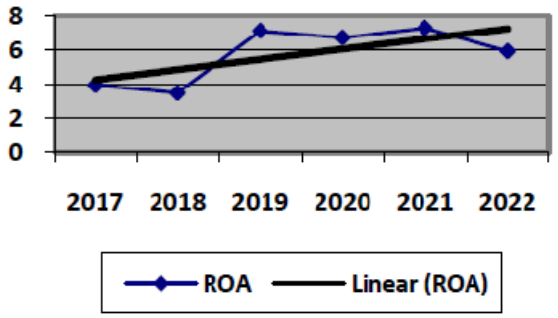

Figure 8: Trend of ROA ratio

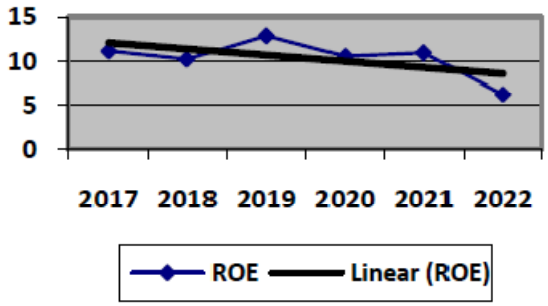

Figure 9: Trend of ROE ratio

Figure 7 to 9 represents the profitability of companies in this ICT section. The trend of ROE is downward, but the ROA is upward.

4.5 Regression

In this section, the regression lines are drawn for each ratio. The p-value of the slope is calculated.

Ratio	R^2	a	b	p-value
Current	0.2251	2.1660	-0.1217	0.3415
Quick	0.2877	1.9093	-0.1103	0.2653
D/A (-)	0.4480	0.5504	0.0070	0.0711
D2E (-)	0.5851	1.6740	0.2455	0.0764
AR	0.9355	6.5373	-0.2340	0.0016
Asset	0.6587	1.0340	-0.0169	0.0462
GPM	0.0055	5.0457	0.0233	0.8883
ROA	0.4568	3.6860	0.5865	0.1405
ROE	0.3551	12.7300	-0.7012	0.2120

Table 6: Regression Analysis

The r-squared shows the quality of the regression line. There are only 3 line that can explain the error of ratio trend more than 50%. The slope, b, of the AR ratio trend line is the most significant as the p-value, 0.0016, is minimum.

V. DISCUSSION

In this section, all results will be interpreted based on each ratio.

5.1. Liquidity Ratio

Liquidity ratio represents the ability to the current debt with the current asset. Usually, the current debt is the obligation without penalty, i.e. interest.

However, failing to pay this kind of debt may incur a penalty such as late fee. A good performance in this ratio would mean a smooth performance in normal operation. The recommended value of liquidity ratio is 1 which means a sufficient of current asset to pay the current debt.

For Thai ICT industry, from Table 3, the overall minimum current ratio is in year 2022 while the overall maximum current ratio is in year 2019. This means the industry has a best performance in 2019 and down to a worst performance in 2022. The overall minimum quick ratio is in year 2018 while the overall maximum quick ratio is in year 2017. This means the industry has the best performance in 2017 and down to the worst performance in 2018. The skewness of both ratios also shows the downward trend so the liquidity of companies are less diverse from each other.

Table 4 also shows the statistically significant reduction in liquidity while Table 5 and Figure 2 illustrated the downward trend of liquidity ratio in this group.

5.2. Solvency Ratio

Solvency ratio represents the ability to pay debt in long term. Based on the long term debt, D/A ratio represents the proportion of asset that return to debtor, not the owner. The D2E ratio looks at the proportion of bargain power between debtors and owners. These 2 ratios are related to each other, as D/A = D/(D+E). With the constant asset, both ratios will have a similar pattern of changes. Unlike liquidity ratio, the higher value of solvency ratio means the worse performance of the company.

From Table 3, the overall maximum D/A ratio is in year 2022 while the overall minimum D/A ratio is in year 2018. This means the industry has the best performance in 2018 and down to a worst performance in 2022. The overall minimum and maximum of D2E also have the same interpretation. The skewness of D/A are all negative, so most companies are on the higher value side. As the value of skewness moves closer to 0, the solvency of companies are less diverse from each other. The skewness of D2E, however, are all positive, so most companies are on the lower value side. As value of skewness moves away from 0, this indicates the solvency of companies are more diverse and, with the positive skewness, many companies have a lower D2E. This means, while the situation is getting worse, most companies still hold their position.

The increment of solvency ratio in the last paragraph, however, didn't statistically significant support by Table 4.One reason might be the skewness increment of D2E after COVID-19 which indicates that most companies have lower D2E and in the higher performance part of the group. Table 5 along with Figure 3 and 4 illustrated the downward trend of solvency ratio in this group.

5.3. Activity Ratio

Activity ratio represents the liveliness of the company. As mentioned above, a company uses its assets, which includes inventory, to generate sales. However, some companies also provide a service to their customers so an account receivable turnover ratio would be a better option.

From Table 3, the overall maximum Turnover ratio is in year 2017 while the overall minimum Turnover ratio is in year 2017. This means the industry has the most variety performance in 2017 and more stable in other years. With a reduction of skewness, it confirms that their performances are closer or less diverse from each other.

While Table 4 also shows no significant change, Table 5 and Figure 5 and 6 illustrate the downward trend of turnover ratio in this group.

5.4. Profitability Ratio

Profitability ratio represents the ability to make profit. Based on accounting principle, this profit comes from sales deducted by cost of goods sold, sales and administrative cost, and others. GPM determines how a product, or a service, can sold itself. ROA and ROE determine how management team can generate sales from the company resource which are asset and equity, respectively.

For GPM of Thai ICT industry, from Table 3, the overall minimum and maximum GPM are both in the same year. This means the industry has the most variety performance in the year 2019 and is more stable in other years. Although the skewness of GPM is swing up and down, they are all close to zero. This can be interpreted that GPM are less diverse from each other. This result also agreed with a small magnitude of skewness. Table 5 and Figure 7 illustrate the tidy shift of this ratio.

For ROA, from Table 3, the overall minimum ROA is in year 2018 while the overall maximum ROA is in year 2019. This means the industry has the worst performance in year 2018 and up to the best performance in year 2019. The skewness of this ratio is tiny swing around the zero which means ROA are less diverse from each other. This result also agreed with Table 5 and Figure 8.

For ROE, form Table 3, the overall minimum is in year 2022 while the overall maximum is in year 2017. This means the industry has the best performance in the year 2017 and down to the worst performance in the year 2022. The skewness of ROE, somehow, shift from positive before COVID-19 to negative after COVID-19. This means most companies move from the worse performance portion to the better performance portion.

VI. CONCLUSION

In this study, both qualitative statistic and quantitative statistics were used to analyze the effect of COVID-19 on Thai ICT industry.

Ratio	Min	Max	t-test	p-value
Current	2022	2019	-	0.05 *
Quick	2018	2017	-	0.05 *
D/A (-)	2018	2022	+	0.46
D2E (-)	2018	2022	+	0.41
AR	2017	2017	-	0.42
Asset	2017	2017	-	0.38
GPM	2019	2019	+	0.86
ROA	2018	2019	+	0.07 *
ROE	2022	2017	-	0.58

Table 7: Qualitative Statistics

Table 7 concluded the results from qualitative statistics that the liquidity is significantly decreased after the COVID-19 while the ROA is significantly increase after the COVID-19

Ratio	Trend	R^2	b	p-value
Current	-	0.2251	-0.1217	0.3415
Quick	-	0.2877	-0.1103	0.2653
D/A (-)	+	0.4480	0.0070	0.0711
D2E (-)	+	0.5851	0.2455	0.0764
AR	-	0.9355	-0.2340	0.0016
Asset	-	0.6587	-0.0169	0.0462
GPM	0	0.0055	0.0233	0.8883
ROA	+	0.4568	0.5865	0.1405
ROE	-	0.3551	-0.7012	0.2120

Table 8: Quantitative Statistics

From the trend analysis in Table 8, while there is a significant decrease in turnover ratio after the COVID-19, there is a slight increase in solvency ratio after the COVID-19.

In conclusion, there exist signals of worse performance in both solvency and activeness of this industry. The companies were getting worse in their liquidity after COVID-19. However, the companies significantly improved their profitability in terms of ROA. As GPM is stable while ROA is increased, this improvement of ROA may come from a long-term service contract.

REFERENCES

[1] Davies, A. (2021). COVID-19 and ICT-supported remote working: Opportunities for rural economies. World, 2(1), 139-152.

[2] Devi, S., Warasniasih, N. M. S., Masdiantini, P. R., & Musmini, L. S. (2020). The impact of COVID-19 pandemic on the financial performance of firms on the Indonesia stock exchange. Journal of Economics, Business, & Accountancy Ventura, 23(2), 226-242.

[3] Fraser, L. M. & Ormiston, A. (2016). Understanding financial statement, 11th edition. Pearson.

[4] Fajriyanti, A. W., & Wiyarni, W. (2022). Corporate financial performance in the Covid-19 pandemic.

[5] The International Air Transportation Association. (2020). Potential for revenue losses of $113bn due to COVID-19 "crisis". (https://airlines.iata.org/2020/03/09/potential-revenue-losses-113bn-due-covid-19-crisis)

[6] Ozili, P. K., & Arun, T. (2023). Spillover of COVID-19: impact on the Global Economy. In Managing Inflation and Supply Chain Disruptions in the Global Economy (pp. 41-61). IGI Global.

[7] Reuter (2020). Coronavirus, oil collapse erase $5 trillion from U.S. stocks. (https://www.reuters.com/article/us-health-coronavirus-stocks-carnage/coronavirus-then-oil-collapse-erase-5-trillion-from-u-s-stocks-idUSKBN20W2TJ

[8] The Securities and Exchange Commission, Thailand. https://www.sec.or.th/EN/Pages/Home.aspx

[9] _____, Industry Group and Business Sector Arrangement (https://portal.set.or.th/th/regulations/simplified_regulations/files/20211130_IndustrySector.pdf)

[10] The Stock Exchange of Thailand. http://www.set.or.th/

[11] Tropea, M., & De Rango, F. (2020). COVID-19 in Italy: current state, impact and ICT-based solutions. IET Smart Cities, 2(2), 74-81.

[12] "Statement on the fifteenth meeting of IHR (2005) Emergency Committee on the COVID-19 pandemic" from World Health Organization (https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-%282005%29-emergency-committee-regarding-the-coronavirus-disease-%28covid-19%29-pandemic)

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