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THE IMPACT OF MERGER AND ACQUISITION ON THE FINANCIAL PERFORMANCE OF THE NASDAQ LISTED SMALL SIZE TECHNOLOGY COMPANIES

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ABSTRACT

Merger and acquisition is a management strategy for corporate restructuring in which consolidation of companies can result in rapid business growth. The paper aims to analyze the impact of merger and acquisition on the financial performance of the business organizations in the technology sector. Therefore, the nine NASDAQ listed technology companies have been selected for this study. The financial data has been collected from the SEC, NASDAQ, and annual reports of the companies. The total study period comprises of twenty-two years ranging from 1996 to 2017. The statistical tool, Independent sample t-test, is applied on the fourteen financial ratios for four years before the merger and four years after the merger. The results of the paper show, that there is an improvement in liquidity, efficiency, and profitability, whereas the leverage ratio has deteriorated during post-acquisition. The study further examines that the profitability ratios are found to be accompanied by a more significant increase than a significant decrease in profitability ratios, and liquidity ratios found to decrease significantly more than significantly increased liquidity ratios. The cash flow has only increased significantly, whereas the leverage ratio has decreased significantly. However, the significant increase and decrease has remained equal in efficiency ratios during the post-acquisition period. In conclusion, the merger and acquisition has improved the overall financial performance. However, profitability and cash flow significantly increased, and leverage and liquidity ratios significantly declined.

Contribution/Originality: This study is one of the very few studies which have investigated the significant effect of the implementation of merger and acquisition strategy on the financial performance of the listed technology firms in NASDAQ over the period from 1996 to 2017.

1. INTRODUCTION

When a growing company acquires another company and assumes the assets and liabilities of the acquired company, this refers to a Merger & Acquisition (M&A), which eradicates the need to create a new company (Bedi, 2018). Tamosiuniene and Duksaite (2009) also define a merger as the consolidation of two companies in which one ceases to exist, while the other one survives and takes over the ownership of the assets and liabilities of the merged entity. Conclusively, there is no difference between "merger" and "acquisition" because both end up with the same results, operating under one chain of control.

There are particular reasons for M&A activity, which include creating value for shareholders, increasing market share, gaining synergies, reducing cost, diversifying into new businesses, reaching new markets, getting tax exemption, and accessing better research and development (Soundarya, Lavanya, & Hemalatha, 2018). Similarly, the motives behind the merger and acquisition are achieving synergy, enhancing efficiency, and eventually giving rise to the share value of stockholders of the acquiring companies (Cui & Leung, 2020).

In the fast-growing business world, growth has become an unavoidable goal for all businesses. According to Omotayo (2019) there is no alternative to growth because it is a fundamental need of the companies. There are two ways that companies can choose to grow either internally, in which firms introduce new products and establish a new business line, or externally through opting for merger and acquisition strategy (Pathak, 2016).

Although the trend of merger and acquisition has been rising, these deals do not result in success all the time because there are several hindrances faced by the acquiring and target companies, particularly differences of culture, structure, and system of operations (Gisella & Chalid, 2017). According to Bruner (2004), the reality of mergers is that eighty percent of mergers fail to achieve success and financial returns.

The US telecom sector has been through a large number of mergers and acquisitions after the changes in the "American Telecommunication Act 1996", and "A WTO Agreement in 1997". The study indicated that the M&A resulted in negative operating performance when the US telecom acquired companies between 1996 and 1999 (Park, Yang, Nam, & Ha, 2002), whereas the sampled Indian telecom companies' performance enhanced, and also significant positive changes were observed in acquiring companies during the post-acquisition period (Seethanaik, 2015). Hence, there is no consistency in the results provided by empirical studies relating to the positive increase in the performance of the acquiring companies after the merger and acquisition activity (Cui & Leung, 2020).

The existing empirical researches did not show clear results of whether the M&A has had a positive significant impact or a negative significant impact on the financial performance of the companies. Also, there is very limited research on the influence of mergers and acquisitions on the financial performance of technology firms.

Therefore, this paper aims to fill the gap to analyze the financial performance of the technology companies listed on the NASDAQ. It evaluates whether there is an increase or decrease in the financial performance of the nine identified companies. Also, the study will investigate the significant changes in the financial performance of the tested companies during the post-acquisition period. The findings of the study will cover this existing gap and should be able to help investors in making investment decisions in the technology sector during the time of M&A, and it, moreover, will add to existing empirical researches by providing with results showing the statistically significant positive or negative change in financial performance due to the implementation of M&A strategy.

The order of the research paper sections follows as second is the literature review, third is the methodology, fourth is results and discussion, and the fifth is the conclusion.

2. LITERATURE REVIEW

Researchers have shown their interest in analyzing the effects of M&A on the operational and financial performance of business organizations. Pahuja and Aggarwal (2016) reviewed the implications of M&A on the nine Indian acquiring banks. They used various financial ratios to observe the effects during three years pre and post-acquisition. A paired sample T-test was applied to these ratios and the results showed that there was no statistically significant change after the Merger and Acquisition whereas, Hussain and Mubeen (2018) concluded that the financial performance of the five Pakistani acquiring banks improved after the merger and acquisition.

Another study was conducted in Nigeria, in which four Nigerian banks were selected and their long-term financial performance was measured for 11 years pre and 11 years post-acquisition period. The study adopted an independent sample T-test technique to analyze ratios during the period pre and post-acquisition. The results revealed that there is a negative and positive significant impact on the Nigerian acquiring baking sector's financial performance after the M&A (Omotayo, 2019).

Nagasha, Bananuka, Musimenta, and Lulu (2017) explored the consequences of M&A on firm performance in East Africa. They adopted the event study method and ratio analysis. The data of 234 M&A deals were collected from different sources including stock exchange markets of East Africa, Zephyr, and Thomas one database from

2005 to 2015. The study concluded that there is a significant relationship between M&A and firm performance. The study further suggested that domestic M&A deals improved the firm performance more than the Cross-border M&A deals.

Pathak (2016) investigated that the operating performance, relating to the profitability of 23 Nepalese financial institutes, did not increase significantly because the return on equity, operating profit margin, and net profit margin decreased after the merger and acquisition activity. Similarly, Shrestha, Thapa, and Phuyal (2018) there is a negative impact on the return on asset and return on equity of six Nepalese banks and financial institutions after the merger. The study also examined that large, especially commercial, bank's performance is positively influenced after acquisition whereas small banks and financial institutions' performance is not. Likewise, Abdul-Ramon and Ayorinde (2012) suggested that the Nigerian commercial banks improved financially after the merger.

Moreover, Bedi (2018) selected five Indian telecom companies to investigate their financial performance before and after the acquisition. It was concluded that the merger did not enhance the financial performance of these companies in the short run. Similarly, (Ghosh & Dutta, 2014) proposed that the overall performance of seven Indian telecom companies was not significantly changed following the merger and acquisition.

(Badreldin & Kalhoefer, 2009) explored that there is no clarity regarding the positive impact on the selected Egyptian banks but there is only a slight positive change in the credit risk position during the post-acquisition period. Mylonidis and Kelnikola (2005) then identified that the Greek bank's profit, operating efficiency, and labor productivity did not improve after the merger while it was concluded that the operating performance of these acquiring banks was better than the non-merging Greek banks.

The cost and profit efficiency of the sampled USA banks increased after the merger. Further, it was examined that while the smaller acquiring banks' cost efficiency was more enhanced than that of the larger acquiring banks, the profit efficiency was recognized in both small and large banks (Al-Sharkas, Hassan, & Lawrence, 2008).

Coccorese and Ferri (2020) conducted a study on the cooperative banks in Italy and they came up with the results that only five percent, out of the total mergers, could improve cost efficiency after the merger.Ooghe, Van Laere, and De Langhe (2006) There is a reduction in the financial performance of the Belgian acquiring companies following the acquisition.

Abdulwahab and Ganguli (2017) concluded that there is no significant effect of merger and acquisition on the financial performance of banks in Bahrain from 2004 to 2015. In opposition to this, Yanan, Hamza, and Basit (2016) investigated that the firms registered in the USA increased their profitability after the merger and acquisition. On the other hand, Gulf Cooperation Council firms faced an insignificant negative impact of merger and acquisition on their profitability in terms of net profit margin and return on assets (Kumaraswamy, Ebrahim, & Nasser, 2019).

Ansari and Mustafa (2018) found that there is no significant impact of merger and acquisition on the financial performance of the six selected Indian acquiring companies after the merger. However, Patel (2018) conducted a study on Indian banks in which he proposed that some of the variables positively influenced and some of the variables negatively impacted in the period during post-acquisition.

Gupta and Banerjee (2017) also did a study on seven Indian companies and used paired sample T-test to determine the impact of merger and acquisition on their financial performance. The results of the study revealed that the overall financial performance of the tested acquiring companies showed no improvement in the post-acquisition period. Oghuvwu and Omoye (2016) opposed that there is a significant positive impact of merger and acquisition on the five selected Nigerian acquiring banks' financial performance after the merger.

Rashid and Naeem (2017) conducted a study on the 25 acquired non-financial companies listed on the Pakistan Stock Exchange between 1995 and 2012. The study concluded that corporate financial performance, including liquidity, leverage, and profitability, of the merged entities, was not impacted by merger and acquisition during the post-merger period. At the same time, M&A had a negative significant impact on the quick ratio of the experimented companies. Similarly, another study in which thirty listed acquiring firms in Greece were selected to observe the financial performance using twelve financial ratios. The findings of the study showed mixed results in which two of the ratios improved and two of the ratios decreased and the rest of the ratios showed no statistically significant change after the merger and acquisition activity (Pazarskis, Alexandrakis, Vogiatzoglou, & Drogalas, 2018).

Poddar (2019) chose Indian companies to study the impact of merger and acquisition with the help of financial ratios for three years before and three years after the merger. He explored that the M&A activity did not add as much value to the acquiring firms as was expected. Sahni and Gambhir (2018) performed a case study analysis of the merger between Centurion Bank of Punjab Ltd and HDFC Bank Ltd and he opted for the CAMEL model to identify the impact of merger and acquisition on their financial performance. He concluded that the merger and acquisition strategy proved to be beneficial for both of the banks in the post-acquisition period. However, Zuhri, Fahlevi, Abdi, Irma, and Maemunah (2020) applied Wilcoxon Signed Ranks Test to observe the influence of M&A on the financial performance of sampled Indonesia stock exchange-listed companies. The overall results of the study showed that there is no significant impact of M&A on the experimented companies' financial performance after the acquisition.

The previous studies have shown conflicting results about the impact of M&A on the companies' financial performance. Therefore, there is a need to investigate whether the companies are positively or negatively influenced by merger and acquisition strategy.

3. METHODOLOGY

Nine NASDAQ listed technology companies, shown in Table 1, have been selected to evaluate the impact of merger and acquisition on these companies' financial performance. The financial data of the sampled companies have been collected from the U.S. Security and Exchange Commission website, companies' official websites, annual reports of the companies, and NASDAQ website. According to the NASDAQ, all of the nine companies are small size technology companies with a market capitalization of about less than $300 million. The annuals reports show that all of these companies have undergone M&A between the periods from 1996 to 2017. Thus, the study period consists of twenty-two years.

The analysis of the financial ratios has been conducted for eight years consisting of four years before and four years after the merger. Table 2 shows the fourteen financial ratios which have been used as variables because these ratios will help to analyze the impact of merger and acquisition in the area of liquidity, leverage, efficiency, cash flow, and profitability performance of nine tested companies. An Independent sample T-test has been applied to evaluate whether the changes before and after the acquisition have been significant or not. The 95 percent confidence level is selected for the Independent sample T-test. The paper will also make a comparison of the financial analysis of the nine companies to see how many firms, out of the experimented companies, have been able to enhance their financial condition with the implementation of merger and acquisition strategy.

Table-1. List of sampled companies.

No.	Acquiring Companies	Target companies	M&A Year
1	PAR Technology Corporation	Springer-Miller Systems, Inc.	October 2004
2	Clearfield Inc.	Computer System Products, Inc.	March 2003
3	RADA Electronic Industries Ltd	Vectop Ltd	February 2005
4	Daktronics Inc.	Keyframe(SM)	April 2000
5	GlobalSCAPE Inc.	Availl, Inc	September 2006
6	Silicom Ltd	Fiberblaze A/S	December 2014
7	iCAD Inc.	Intelligent Systems Software, Inc.	June 2002
8	ServiceSource International Inc.	Scout Analytics, Inc.	January 2014
9	Ceragon Networks Ltd	Electronics Circuits and Systems S.A	September 2010

Table-2. Variables of the study.

Parameters	Variables	Explanation / Formula
Liquidity	Current Ratio	Current Assets
		Current Liabilities
	Quick Ratio	Current Asset -Inventory-Prepaid Expense
		Current Liabilities
Leverage	Debt Equity Ratio	Total Liability
		Total Shareholders Equity
Efficiency	Assets Turnover Ratio	Net Sales
		Average Total Assets
	Sales to Fixed Assets Ratio	Net Sales
		Average Property, Plant, and Equipment, Net
	Working Capital Turnover Ratio	Net Sales
		Average Working Capital
Profitability	Profit Before Interest And Tax (Ebita) Margin	Operating Income
		Net Sales
	Net Profit Margin	Net Income
		Net Sales
	Return on Assets (ROA)	Operating Income
		Average Total Assets
	Return on Equity (ROE)	Net Income
		Average Total Shareholders Equity
	Earnings Per Share	Net Income
		Outstanding Shares
	Return on Capital Employed	Operating Income
		Total Asset - Current Liabilities = Capital Employed
Cash Flow	Operating Cash Flow Ratio	Operating Cash Flow
		Current Liabilities
	Cash Flow Margin Ratio	Operating Cash Flows
		Net Sales

4. RESULTS AND DISCUSSION

The independent sample T-test has been used to identify significant impact merger and acquisition on the financial performance of PAR Technology Corporation. Table 3 shows the T-values, mean difference, and mean values of fourteen financial ratios of PAR Technology four years pre-merger and four years post-merger. It also shows the P-values (Sig. (2-tailed)) which indicate that the change after the merger is significant or insignificant.

Table-3. Analysis of the financial performance of PAR technology corporation

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	2.0550	1.9000	.15500	.822	.443	Decreased	Insignificantly
	Quick Ratio	4	1.1775	1.1925	-.01500	-.158	.880	Increased	Insignificantly
Leverage	Debt Equity Ratio	4	.7300	.6825	.04750	.622	.557	Decreased	Insignificantly
Efficiency	Assets Turnover Ratio	4	.9475	1.0625	-.11500	-1.431	.203	Increased	Insignificantly
	Sales to Fixed Assets Ratio	4	9.2150	17.0650	-7.85000	-5.319	.002	Increased	Significantly
	Working Capital Turnover Ratio	4	3.5675	4.8025	-1.23500	-3.961	.007	Increased	Significantly
Profitability	EBITA	4	-.0350	.0350	-.07000	-1.136	.299	Increased	Insignificantly

	Margin								
	Net Profit Margin	4	-.0250	.0250	-.05000	-1.336	.230	Increased	Insignificantly
	Return on Assets	4	-.0250	.0375	-.06250	-1.182	.282	Increased	Insignificantly
	Return on Equity	4	-.0300	.0450	-.07500	-1.432	.202	Increased	Insignificantly
	Return on Capital Employed	4	-.0650	.0875	-.15250	-1.156	.292	Increased	Insignificantly
	Earnings Per Share	4	-.3200	.3625	-.68250	-1.355	.224	Increased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	-.0025	.1950	-.19750	-1.499	.185	Increased	Insignificantly
	Cash Flow Margin Ratio	4	-.0075	.0475	-.05500	-1.499	.184	Increased	Insignificantly

Table 3 shows that only the current ratio and debt-equity ratio have decreased whereas the rest of the twelve ratios have increased. This means that there is an improvement in the leverage, profitability, efficiency, and cash flow of PAR Technology Corporation after the merger. However, only the sales to fixed assets ratio and working capital turnover ratio have improved significantly and no significant decline has been found in any ratio of PAR Technology Corporation.

Table-4. Analysis of the financial performance of clearfield inc.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	12.8050	5.6450	7.16000	3.720	.010	Decreased	Significantly
	Quick Ratio	4	12.3875	5.1050	7.28250	3.813	.009	Decreased	Significantly
Leverage	Debt Equity Ratio	4	.4275	-.0925	.52000	1.503	.184	Decreased	Insignificantly
Efficiency	Assets Turnover Ratio	4	.0300	.4975	-.46750	-2.208	.069	Increased	Insignificantly
	Sales to Fixed Assets Ratio	4	.1500	1.0975	-.94750	-2.360	.056	Increased	Insignificantly
	Working Capital Turnover Ratio	4	.0925	.9675	-.87500	-2.415	.052	Increased	Insignificantly
Profitability	EBITA Margin	4	-6.9200	-3.3150	-3.60500	-1.091	.317	Increased	Insignificantly
	Net Profit Margin	4	-5.9450	-3.1250	-2.82000	-.893	.406	Increased	Insignificantly
	Return on Assets	4	-.1775	-.1725	-.00500	-.091	.931	Increased	Insignificantly
	Return on Equity	4	-.2575	-.1325	-.12500	-1.192	.278	Increased	Insignificantly
	Return on Capital Employed	4	-.2750	.8050	-1.08000	-1.040	.338	Increased	Insignificantly
	Earnings Per Share	4	-.3550	-.3850	.03000	.413	.694	Decreased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	-4.2775	-1.2600	-3.01750	-1.549	.172	Increased	Insignificantly
	Cash Flow Margin Ratio	4	-4.9925	-2.8775	-2.11500	-.712	.503	Increased	Insignificantly

Table 4 displays that all the ratios have increased except the current ratio, quick ratio debt-equity ratio, and earnings per share. Clearfield Inc has faced betterment in cash flow, efficiency, and profitability following the merger and acquisition. Nonetheless, the current ratio and quick ratio have deteriorated significantly, whereas (Singh. & Gupta, 2015) found that there is an insignificant increase in quick ratio and an insignificant decline in the current ratio.

Table-5. Analysis of the financial performance of RADA electronic industries ltd.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	.6450	1.5375	-.89250	-2.931	.026	Increased	Significantly
	Quick Ratio	4	.4625	1.0675	-.60500	-2.530	.045	Increased	Significantly
Leverage	Debt Equity Ratio	4	14.2600	1.6350	12.62500	1.861	.112	Decreased	Insignificantly
Efficiency	Assets Turnover Ratio	4	.4725	.5400	-.06750	-.965	.372	Increased	Insignificantly
	Sales to Fixed Assets Ratio	4	1.4275	2.8400	-1.41250	-3.334	.016	Increased	Significantly
	Working Capital Turnover Ratio	4	-.1225	8.9925	-9.11500	-1.526	.178	Increased	Insignificantly
Profitability	EBITA Margin	4	-.1300	-.0625	-.06750	-.621	.557	Increased	Insignificantly
	Net Profit Margin	4	-.1300	-.1075	-.02250	-.189	.856	Increased	Insignificantly
	Return on Assets	4	-.0450	-.0300	-.01500	-.358	.733	Increased	Insignificantly
	Return on Equity	4	-.9675	-.1450	-.82250	-1.103	.312	Increased	Insignificantly
	Return on Capital Employed	4	-.3425	-.0775	-.26500	-1.174	.285	Increased	Insignificantly
	Earnings Per Share	4	-.0800	-.1300	.05000	.647	.541	Decreased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	.0450	-.2050	.25000	1.146	.295	Decreased	Insignificantly
	Cash Flow Margin Ratio	4	.0000	-.0900	.09000	.833	.437	Decreased	Insignificantly

Table 5 indicates that only the debt-equity ratio, operating cash flow ratio, earnings per share, and cash flow margin ratio declined while all the other ten ratios enhanced. This reveals that the cash flow and leverage did not improve whereas the liquidity, efficiency, and profitability increased after the merger. There is a statistically significant improvement in sales to fixed assets ratio, quick ratio, and current ratio, similarly, the current ratio significantly increased in the study conducted by Omotayo (2019) but the increase or decrease in the remaining financial ratios remain insignificant.

Table-6. Analysis of the financial performance of daktronics inc.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	1.7700	2.0325	-.26250	-1.688	.142	Increased	Insignificantly
	Quick Ratio	4	1.1250	1.4350	-.31000	-1.920	.103	Increased	Insignificantly
Leverage	Debt Equity Ratio	4	.8650	.8100	.05500	.389	.711	Decreased	Insignificantly
Efficiency	Assets Turnover Ratio	4	1.1950	1.1825	.01250	.182	.862	Decreased	Insignificantly
	Sales to Fixed Assets Ratio	4	6.3025	4.7650	1.53750	2.246	.066	Decreased	Insignificantly
	Working Capital Turnover Ratio	4	5.4025	5.3375	.06500	.158	.879	Decreased	Insignificantly
Profitability	EBITA Margin	4	.0425	.0850	-.04250	-1.972	.096	Increased	Insignificantly
	Net Profit Margin	4	.0275	.0525	-.02500	-1.786	.124	Increased	Insignificantly
	Return on Assets	4	.0475	.1025	-.05500	-2.110	.079	Increased	Insignificantly
	Return on Equity	4	.0575	.1175	-.06000	-2.005	.092	Increased	Insignificantly
	Return on Capital Employed	4	.1125	.2175	-.10500	-1.963	.097	Increased	Insignificantly
	Earnings Per Share	4	.5050	.5075	-.00250	-.010	.992	Increased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	-.0650	.1400	-.20500	-1.071	.325	Increased	Insignificantly
	Cash Flow Margin Ratio	4	-.0200	.0275	-.04750	-1.358	.223	Increased	Insignificantly

Table 6 illustrates that the ten ratios improved apart from four ratios such as debt-equity ratio, assets turnover ratio, sales to fixed assets ratio, and working capital turnover ratio. The liquidity, profitability, and cash flow progressed, in comparison, the leverage and efficiency dropped during the post-acquisition. However, there is no significant increase or decrease in any of the financial ratios of Daktronics Inc. These are the same results of the study conducted by Bedi (2018) and Pathak (2016).

Table-7. Analysis of the financial performance of GlobalSCAPE Inc.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	1.9425	2.0450	-.10250	-.224	.830	Increased	Insignificantly
	Quick Ratio	4	1.8125	2.0175	-.20500	-.443	.673	Increased	Insignificantly
Leverage	Debt Equity Ratio	4	1.1125	.5525	.56000	1.196	.277	Decreased	Insignificantly
Efficiency	Assets Turnover	4	2.6575	.7000	1.95750	5.781	.001	Decreased	Significantly

	Ratio								
	Sales to Fixed Assets Ratio	4	15.8425	24.9000	-9.05750	-.785	.462	Increased	Insignificantly
	Working Capital Turnover Ratio	4	71.2150	3.7075	67.50750	1.117	.307	Decreased	Insignificantly
Profitability	EBITA Margin	4	.0125	.0475	-.03500	-.166	.874	Increased	Insignificantly
	Net Profit Margin	4	.0050	-.0025	.00750	.041	.969	Decreased	Insignificantly
	Return on Assets	4	.0075	.0225	-.01500	-.064	.951	Increased	Insignificantly
	Return on Equity	4	-.0600	-.0075	-.05250	-.134	.898	Increased	Insignificantly
	Return on Capital Employed	4	-.3325	-.0475	-.28500	-.403	.701	Increased	Insignificantly
	Earnings Per Share	4	.0025	-.0075	.01000	.066	.949	Decreased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	.8950	1.0150	-.12000	-.267	.798	Increased	Insignificantly
	Cash Flow Margin Ratio	4	.0950	.2575	-.16250	-3.063	.022	Increased	Significantly

Table 7 shows that the nine ratios have increased, but the debt-equity ratio, assets turnover ratio, working capital ratio, net profit margin, and earnings per share have declined. Here, the cash flow margin ratio has increased significantly, while the assets turnover ratio has reduced significantly. No other ratios significantly increased or decreased after the merger.

Table- 8. Analysis of the financial performance of Silicom Ltd.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	6.3625	5.1575	1.20500	1.559	.170	Decreased	Insignificantly
	Quick Ratio	4	4.6650	3.2000	1.46500	2.765	.033	Decreased	Significantly
Leverage	Debt Equity Ratio	4	.1575	.2050	-.04750	-2.061	.085	Increased	Insignificantly
Efficiency	Assets Turnover Ratio	4	.3975	.4575	-.06000	-1.409	.208	Increased	Insignificantly
	Sales to Fixed Assets Ratio	4	32.9275	19.4800	13.44750	6.675	.001	Decreased	Significantly
	Working Capital Turnover Ratio	4	1.0150	1.2350	-.22000	-3.111	.021	Increased	Significantly
Profitability	EBITA Margin	4	.2125	.2025	.01000	.538	.610	Decreased	Insignificantly
	Net Profit Margin	4	.2075	.1725	.03500	1.980	.095	Decreased	Insignificantly

	Return on Assets	4	.0850	.0925	-.00750	-.493	.639	Increased	Insignificantly
	Return on Equity	4	.0950	.0950	0.00000	0.000	1.000	Increased	Insignificantly
	Return on Capital Employed	4	.1375	.1525	-.01500	-.663	.532	Increased	Insignificantly
	Earnings Per Share	4	1.4450	2.2175	-.77250	-1.912	.104	Increased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	.5500	.4200	.13000	.414	.693	Decreased	Insignificantly
	Cash Flow Margin Ratio	4	.1100	.1025	.00750	.099	.924	Decreased	Insignificantly

Table 8 demonstrates that the debt-equity ratio, assets turnover ratio, working capital turnover ratio, return on assets, return on equity, earnings per share, and return on capital employed, improved, while the remaining ratios decreased during the post-merger. However, the working capital turnover ratio has improved significantly, whereas sales to fixed assets ratio and quick ratio have decreased significantly. The quick ratio increased insignificantly in a study conducted by Singh. and Gupta (2015). The rest of the ratios' change has been insignificant.

Table-9. Analysis of the financial performance of iCAD Inc.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	2.1375	1.4800	.65750	1.801	.122	Decreased	Insignificantly
	Quick Ratio	4	.8475	1.2300	-.38250	-1.082	.321	Increased	Insignificantly
Leverage	Debt Equity Ratio	4	1.2100	.2100	1.00000	4.965	.003	Decreased	Significantly
Efficiency	Assets Turnover Ratio	4	.7150	.1800	.53500	6.709	.001	Decreased	Significantly
	Sales to Fixed Assets Ratio	4	6.8325	8.9175	-2.08500	-1.015	.349	Increased	Insignificantly
	Working Capital Turnover Ratio	4	2.6200	1.7425	.87750	.398	.705	Decreased	Insignificantly
Profitability	EBITA Margin	4	-.4050	-.8400	.43500	.984	.363	Decreased	Insignificantly
	Net Profit Margin	4	-.5000	-.8550	.35500	.801	.454	Decreased	Insignificantly
	Return on Assets	4	-.2725	-.1233	-.14925	-1.851	.114	Increased	Insignificantly
	Return on Equity	4	-.7525	-.1575	-.59500	-3.917	.008	Increased	Significantly
	Return on Capital Employed	4	-.7300	-.1688	-.56125	-3.070	.022	Increased	Significantly
	Earnings Per Share	4	-.2675	-.2325	-.03500	-.346	.741	Increased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	-.1000	-.4025	.30250	.540	.608	Decreased	Insignificantly
	Cash Flow Margin Ratio	4	-.0700	-.3300	.26000	1.059	.331	Decreased	Insignificantly

Table 9 indicates that Quick Ratio, Sales to Fixed Assets Ratio, Return on Assets, Return on Equity, Earnings per share, Return on Capital Employed improved after the acquisition whereas the rest of the other ratios are found to have diminished. Here, there is a significant increase return on capital employed and return on equity, which is opposite to negative significant impact on return on equity investigated by Jallow, Masazing, and Basit (2017) and debt-equity ratio and assets turnover ratio have significantly decreased following the acquisition.

Table-10. Analysis of the financial performance of ServiceSource International Inc.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	5.1225	5.5825	-.46000	-.218	.835	Increased	Insignificantly
	Quick Ratio	4	4.9750	5.4275	-.45250	-.218	.834	Increased	Insignificantly
Leverage	Debt Equity Ratio	4	.8150	1.2875	-.47250	-.959	.374	Increased	Insignificantly
Efficiency	Assets Turnover Ratio	4	.7400	.5225	.21750	2.124	.078	Decreased	Insignificantly
	Sales to Fixed Assets Ratio	4	5.6050	5.7025	-.09750	-.159	.879	Increased	Insignificantly
	Working Capital Turnover Ratio	4	2.5275	1.6550	.87250	.660	.534	Decreased	Insignificantly
Profitability	EBITA Margin	4	-.0275	-.1475	.12000	2.085	.082	Decreased	Insignificantly
	Net Profit Margin	4	-.0525	-.1900	.13750	1.826	.118	Decreased	Insignificantly
	Return on Assets	4	-.0150	-.0750	.06000	1.964	.097	Decreased	Insignificantly
	Return on Equity	4	-.0575	-.2075	.15000	2.435	.051	Decreased	Insignificantly
	Return on Capital Employed	4	-.0250	-.1625	.13750	2.672	.037	Decreased	Significantly
	Earnings Per Share	4	-.1750	-.5800	.40500	1.581	.165	Decreased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	.0650	-.0625	.12750	.534	.612	Decreased	Insignificantly
	Cash Flow Margin Ratio	4	-.0125	.0050	-.01750	-.339	.746	Increased	Insignificantly

Table 10 shows that there is an improvement in current ratio, quick ratio, debt-equity ratio, sales to fixed assets ratio, and cash flow margin ratio, whereas the rest of the ratios have deteriorated after the merger. However, the significant decline has been observed in return on capital employed, and no significant increase has been found in any other ratios of Service Source International Inc. Overall, there is a negative financial performance which is the same as investigated by Ooghe et al. (2006).

Table-11. Analysis of the financial performance of Ceragon Networks Ltd.

Parameters	Financial Ratios	N	Pre-Merger	Post-Merger	Mean Difference	T	Sig. (2-tailed)	Increase / Decrease	Significantly / Insignificantly
Liquidity	Current Ratio	4	3.1025	2.1150	.98750	1.931	.102	Decreased	Insignificantly
	Quick Ratio	4	2.1550	1.3725	.78250	1.881	.109	Decreased	Insignificantly
Leverage	Debt Equity Ratio	4	.5525	1.3525	-.80000	-2.245	.066	Increased	Insignificantly
Efficiency	Assets Turnover Ratio	4	.6250	.6950	-.07000	-.823	.442	Increased	Insignificantly
	Sales to Fixed Assets Ratio	4	21.6900	9.7325	11.95750	2.901	.027	Decreased	Significantly
	Working Capital Turnover Ratio	4	1.5825	2.8000	-1.21750	-2.340	.058	Increased	Insignificantly
Profitability	EBITA Margin	4	.0200	-.0400	.06000	1.279	.248	Decreased	Insignificantly
	Net Profit Margin	4	.0425	-.0600	.10250	1.787	.124	Decreased	Insignificantly
	Return on Assets	4	.0100	-.0350	.04500	1.372	.219	Decreased	Insignificantly
	Return on Equity	4	.0250	-.1200	.14500	1.945	.100	Decreased	Insignificantly
	Return on Capital Employed	4	.0100	-.0925	.10250	1.403	.210	Decreased	Insignificantly
	Earnings Per Share	4	.2475	-.7450	.99250	2.173	.073	Decreased	Insignificantly
Cash Flow	Operating Cash Flow Ratio	4	-.0225	-.0975	.07500	.748	.483	Decreased	Insignificantly
	Cash Flow Margin Ratio	4	.0025	-.0375	.04000	1.071	.325	Decreased	Insignificantly

Table 11 displays that only the debt-equity ratio, assets turnover ratio, and working capital turnover ratio increased, while the other ratios reduced during the post-merger period. This supports the study conducted by Ooghe et al. (2006) on Belgian acquiring companies that faced a decline in financial performance after M&A. There is a significant decrease in sales to fixed assets ratio of Ceragon Networks Ltd. Apart from this ratio, the rest of the ratios faced no significant increase or decrease.

Table-12. Comparison of the financial performance of nine sampled companies.

Ratio Increased	↑
Ratio Decreased	↓
Significantly Increased	↑ Sig
Significantly Decreased	↓ Sig

Parameters		PAR	Clearfield	RADA	Daktronics	Global	Silicom	iCAD	Service Source	Ceragon	No of firms Increased ratio	No of firms Decreased ratio
Liquidity	Current Ratio	↓	↓ Sig	↑ Sig	↑	↑	↓	↓	↑	↓	4	5
	Quick Ratio	↑	↓ Sig	↑ Sig	↑	↑	↓ Sig	↑	↑	↓	6	3
Leverage	Debt Equity Ratio	↓	↓	↓	↓	↓	↑	↓ Sig	↑	↑	3	6
Efficiency	Assets Turnover Ratio	↑	↑	↑	↓	↓ Sig	↑	↓ Sig	↓	↑	5	4
	Sales to Fixed Assets Ratio	↑ Sig	↑	↑ Sig	↓	↑	↓ Sig	↑	↑	↓ Sig	6	3
	Working Capital Turnover Ratio	↑ Sig	↑	↑	↓	↓	↑ Sig	↓	↓	↑	5	4
Profitability	EBITA Margin	↑	↑	↑	↑	↑	↓	↓	↓	↓	5	4
	Net Profit Margin	↑	↑	↑	↑	↓	↓	↓	↓	↓	4	5
	Return on Assets	↑	↑	↑	↑	↑	↑	↑	↓	↓	7	2
	Return on Equity	↑	↑	↑	↑	↑	↑	↑ Sig	↓	↓	7	2
	Return on Capital Employed	↑	↑	↑	↑	↑	↑	↑ Sig	↓ Sig	↓	7	2
	Earnings Per Share	↑	↓	↓	↑	↓	↑	↑	↓	↓	4	5
Cash Flow	Operating Cash Flow Ratio	↑	↑	↓	↑	↑	↓	↓	↓	↓	4	5
	Cash Flow Margin Ratio	↑	↑	↓	↑	↑ Sig	↓	↓	↑	↓	5	4
Number of ratios Increased		12	10	10	10	9	7	6	5	3	Total	72
Number of ratios Decreased		2	4	4	4	5	7	8	9	11	Total	54
Number of ratios Increased Significantly		2	0	3	0	1	1	2	0	0	Total	9
Number of ratios Decreased Significantly		0	2	0	0	1	2	2	1	1	Total	9

Note:
*Annual reports of the selected companies.
*Computed statistical results with SPSS.

4.1. Company-Wise Comparison

Table 12 shows the analysis of fourteen financial ratios of nine selected technology companies. PAR has increased its twelve financial ratios after the acquisition and three companies, such as Clearfield, RADA, and Daktronics, also faced an increment in their ten financial ratios following the merger. Similarly, Global is found to have increased the nine financial ratios post-acquisition. However, the table has only one company, Ceragon, which represents the negative impact of merger and acquisition on the company's eleven financial ratios. Furthermore, it is visible from the above table that there are three firms, including Silicom, iCad, and Servicesource, in which the number of ratios could not improve more than half of the financial ratios such as 7, 6, 5 respectively.

Here, it can be observed from the table whether the increase or decrease is significant or not. It is found from the results that there are two companies, PAR and RADA, in which financial ratios (sales to fixed assets ratio, working capital turnover ratio, and current ratio, quick ratio and sales to fixed assets ratio, respectively) increased significantly and no significant decrease has been observed in any financial after the merger, whereas there is no significant increase in any of the financial ratios of three companies (ServiceSource, Ceragon and Clearfield,) but there is only a significant decline in their financial ratios (return on capital employed, sales to fixed assets ratio, and current ratio, quick ratio, respectively) following the merger.

The table also shows the group of three firms in which some of the financial ratios have increased as well as decreased significantly. The cash flow margin ratio has significantly enhanced and assets turnover ratio has significantly decreased in Global, while in Silicom, the working capital turnover ratio has significantly increased but sales to fixed assets ratio and quick ratio have significantly reduced during the post-acquisition. However, no significant increase or decrease has been found in any of the financial ratios of Daktronics after the merger and acquisition.

4.2. Ratio Wise Comparison

The overall profitability of the companies enhanced after the merger and acquisition. The study shows that the return on assets increased in seven of the experimented companies, including PAR, Clearfield, RADA, Daktronics, Global, Silicom, and iCAD, and decreased only in two of the selected companies, ServiceSource, Ceragon. Also, the return on equity improved in seven of the sampled companies, namely PAR, Clearfield, RADA, Daktronics, Global, Silicom, and iCAD, and deteriorated only in ServiceSource and Ceragon. Similarly, the return on capital employed was enhanced in seven of the identified companies, PAR, Clearfield, RADA, Daktronics, Global, Silicom, and iCAD, and dropped only in two of the tested companies, ServiceSource and Ceragon. The EBITA margin enhanced in five of the companies, PAR, Clearfield, RADA, Daktronics, Global, and declined in four of the companies, namely Silicom, iCAD, ServiceSource, and Ceragon. The net profit margin of PAR, Clearfield, RADA, and Daktronics showed an improvement, whereas the net profit margin of Global, Silicom, iCAD, ServiceSource, and Ceragon deteriorated after the merger. Similarly, earnings per share increased in four of the companies, PAR, Daktronics, Silicom, and iCAD, while it decreased in five of the companies, Clearfield, RADA, Global, ServiceSource and Ceragon. Although the net profit margin and earning per share deteriorated in five of the companies, the increased number of profitability ratios are more than the decreased ones in all of the companies. This means that the companies improved their profitability following the acquisition.Yanan et al. (2016) found the same results which showed that the profitability of the firms was enhanced after the merger.

In the same way, efficiency also improved after the merger and acquisition in the sampled companies. This can be observed in three efficiency ratios such as assets turnover ratio, sales to fixed assets ratio, and working capital turnover ratio. Assets turnover ratio increased in five of the companies, PAR, Clearfield, RADA, Silicom, and Ceragon, and diminished in four of the companies, Daktronics, Global, iCAD, and ServiceSource. Sales to fixed assets ratio enhanced in PAR, Clearfield, RADA, Global, iCAD, and ServiceSource, whereas decreased only three of the companies, Daktronics, Silicom, and Ceragon. The working capital turnover ratio increased in five of the companies, PAR, Clearfield, RADA, Silicom, and Ceragon while, it deteriorated in Daktronics, Global, iCAD, and ServiceSource following the merger and acquisition activity. Similar to profitability ratios, the efficiency ratios that increased exceeds the number of ratios that decreased in the sampled companies during the post-merger. This indicates that efficiency faced an improvement during the period of post-acquisition.

Besides, there is an increase in the selected firms' liquidity because quick ratio improved in PAR, RADA, Daktronics, Global, iCAD, and ServiceSource, whereas it dropped in only three of the companies, Clearfield, Silicom and Ceragon. The current ratio deteriorated in PAR, Clearfield, iCAD, Silicom, and Ceragon, while increased in four of the companies, RADA, Daktronics, Global, and ServiceSource. Even though more than half of the companies' current ratio declined, the sum of improved liquidity ratios of nine companies is more than the ratios that decreased. This shows that there is a positive change in post-merger liquidity ratios.

The number of cash flow ratios equally increased and decreased after the merger. The operating cash flow ratio improved in PAR, Clearfield, Daktronics, and Global, whereas it dropped in RADA, Silicom, iCAD, ServiceSource, and Ceragon. The cash flow margin ratio increased in five of the sampled companies, PAR, Clearfield, Daktronics, Global, and ServiceSource, while it deteriorated in four of the companies, RADA, Silicom, iCAD, and Ceragon. Despite the overall same number of increase and decrease in cash flow ratios, the operating cash flow ratio diminished and the cash flow margin ratio improved following the merger and acquisition activity.

However, the leverage has decreased during the post-acquisition period because the debt-equity ratio increased only in three of the identified companies, Silicom, ServiceSource, and Ceragon, whereas it dropped in six of the companies, PAR, Clearfield, RADA, Daktronics, Global, and iCAD.

4.3. Significant and Insignificant Change

In this study, most of the significant effect of merger and acquisition has been found in efficiency ratios. The asset turnover ratio significantly decreased in Global and iCAD, while it insignificantly changed in PAR, Clearfield, RADA, Daktronics, Silicom, ServiceSource, and Ceragon following the merger and acquisition. The sales to fixed assets ratio significantly improved in PAR and RADA and deteriorated significantly in Silicom and Ceragon, whereas the sales to fixed assets ratio changed insignificantly in Clearfield, Daktronics, Global, iCAD, and ServiceSource. The working capital turnover ratio faced a significant improvement in PAR and Silicom and the insignificant change found in Clearfield, RADA, Daktronics, Global, iCAD, ServiceSource, and Ceragon. In spite of the fact that an equal number of efficiency ratios significantly increased and the same number of efficiency ratios significantly decreased, the asset turnover ratio improved significantly and the sales to fixed assets ratio dropped significantly. Poddar (2019) explored that the efficiency ratios did not improve in all of the selected companies.

The profitability of the selected companies also faced a significant impact of merger and acquisition. The return on equity significantly enhanced in iCAD and insignificantly changed in PAR, Clearfield, RADA, Daktronics, Global, Silicom, ServiceSource, and Ceragon. The return on capital employed significantly improved in iCAD and significantly decreased in ServiceSource, whereas there is an insignificant impact on return on capital employed in PAR, Clearfield, RADA, Daktronics, Global, Silicom and Ceragon. The rest of the ratios, EBITA margin, net profit margin, return on assets, and earning per share, had an insignificant impact of M&A in PAR, Clearfield, RADA, Daktronics, Global, Silicom, iCAD, ServiceSource, and Ceragon. Overall, the profitability of the tested companies significantly increased during the post-acquisition period. Whereas Gupta and Banerjee (2017) showed that the profitability did not improve significantly after the merger.

In the same way, the cash flow of the identified companies had a positive significant influence of M&A. The cash flow margin ratio improved significantly in Global and insignificantly changed in PAR, Clearfield, RADA, Daktronics, Silicom, iCAD, ServiceSource, and Ceragon. In comparison, the operating cash flow ratio insignificantly changed in PAR, Clearfield, RADA, Daktronics, Global, Silicom, iCAD, ServiceSource, and Ceragon. With this, the cash flow improved significantly in the experimented companies after the merger and acquisition activity.

The liquidity showed a negative impact of merger and acquisition in the experimented companies. The current ratio significantly declined in Clearfield and significantly improved in RADA, while it insignificantly changed in PAR, Daktronics, Global, Silicom, iCAD, ServiceSource, and Ceragon. The quick ratio significantly increased in RADA and significantly dropped in Clearfield and Silicom, whereas it changed insignificantly in PAR, Daktronics, Global, iCAD, ServiceSource, and Ceragon. Therefore, there is a significant negative impact on the liquidity of the selected companies following the merger and acquisition strategy. Ansari and Mustafa (2018) proposed that the current ratio and quick ratio decreased insignificantly after the merger.

Similarly, the leverage also faced the negative effect of M&A in the tested companies because of the fact that the debt-equity ratio significantly declined in iCAD and insignificantly changed in PAR, Clearfield, RADA, Daktronics, Global, Silicom, ServiceSource, and Ceragon. So, the leverage decreased significantly in the selected companies during the post-acquisition period. Similarly, Gupta and Banerjee (2017) concluded that leverage indicators decreased significantly following the merger, and Rashid and Naeem (2017) found that the M&A did not influence leverage.

5. CONCLUSION

The study results indicate that the financial performance of selected companies increased after the merger because the overall aggregate number of financial ratios that increased is higher than the total number of financial ratios that declined. This improvement can be observed from liquidity, efficiency, and profitability ratios. On average two of the financial ratios of eight of the experimented companies have been significantly impacted whereas no significant impact found in one of the nine companies after the merger and acquisition. With this, the study concludes that there is a significant impact of M&A on the financial performance of the companies. On the whole, the positively significant effect and negatively significant impact on financial performance remained equal because nine of the financial ratios increased significantly as well as nine of the financial ratios decreased significantly. Despite this neutral significant impact, the negative significant influence on liquidity ratios is more than the positive significant impact, whereas the positive significant effect on profitability ratios is more than the negative significant influence. Moreover, the leverage ratio faced only a negative significant impact, while cash flow was found to have only a positive significant impact. However, the positive significant effect on efficiency ratios is equal to the negative significant impact on efficiency ratios.

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