



Impact of COVID-19 on Stock Prices in the Technology Sector

Seng Fong (Vinson) Chang
Muchan (Catherine) Gao

Xiaohan (Miranda) Chen
Derek He

Yiyang Duanmu
Jiahui (Vivian) Tian

Feiran Zhang

Abstract

- On March 11, WHO declared a global pandemic and U.S. stock market tumbled.
- **Data:** stock prices for 500 companies in the technology sector from February 18, 2020 to July 30, 2021 (With COVID cases)
- **Users:** shareholders, future investors and management in technology companies
- In our dashboard, users will be able to:
 - Stock price changes over time by industry and company
 - Average Daily Percentage
 - Cumulative Industry Percentage Changes
 - Daily and Cumulative cases and deaths in the U.S.

Problem of Focus

- Trading curbs in the US stock market in February and March 2020
- During COVID-19, more cash injected into US stock market
- Many stocks are still recovering from the impact of COVID-19 while other stocks surged
- Is the technology a promising sector to invest in?

Original Datasets

				industry	market_cap(\$M)	market_size
Symbol						
AAPL		other			2944000.000	5
MSFT	Software—Infrastructure				2572000.000	5
NVDA	Semiconductors				752534.000	5
TSM	Semiconductors				617818.000	5
ASML	Semiconductors				327873.000	5
...	
PCTI	Communication Equipment				106.700	1
OPFI	Software—Application				68.130	1
TESS	Communication Equipment				61.602	1
MINDP	Scientific & Technical Instruments				34.338	1
BBAI		other			1064.000	1

503 rows × 3 columns

Original Datasets

	date	cumulative_total_cases	daily_new_cases	cumulative_total_deaths	daily_new_deaths	AAPL	MSFT	NVDA	TSM	ASML	...
0	2020-02-18	15	0	0	0	78.769226	183.727295	296.316742	54.083893	304.757629	...
1	2020-02-19	15	0	0	0	79.910027	184.278305	314.431244	55.489414	312.850220	...
2	2020-02-20	15	0	0	0	79.090218	181.464157	308.436432	54.372700	308.986298	...
3	2020-02-21	35	20	0	0	77.300026	175.727600	293.818878	53.515903	301.623138	...
4	2020-02-22	35	0	0	0	77.300026	175.727600	293.818878	53.515903	301.623138	...

5 rows × 469 columns

Original Datasets

	0	1	2	3	4	5	6	7	8	9	...
country	Afghanistan	Albania	Algeria	Andorra	Angola	Anguilla	Antigua And Barbuda	Argentina	Armenia	Aruba	...
continent	Asia	Europe	Africa	Europe	Africa	North America	North America	South America	Asia	North America	...
total_confirmed	147473	133081	171392	14678	42646	113	1303	4929764	230110	11730	...
total_deaths	6736	2457	4254	128	1008	NaN	43	105721	4614	110	...
total_recovered	98073	130222	115276	14210	36708	111	1235	4.56955e+06	219864	11160	...
active_cases	42664	402	51862	340	4930	2	25	254491	5632	460	...
serious_or_critical	1124	3	47	NaN	8	NaN	3	3976	NaN	14	...
total_cases_per_1m_population	3699	46299	3834	189643	1256	7460	13188	108009	77499	109367	...
total_deaths_per_1m_population	169	855	95	1654	30	NaN	435	2316	1554	1026	...
total_tests	707244	916777	230861	193595	681443	31656	17147	1.94236e+07	1.34026e+06	177885	...
total_tests_per_1m_population	17739	318945	5164	2.50129e+06	20065	2.08992e+06	173549	425562	451385	1.65854e+06	...
population	39869084	2874408	44701619	77398	33961015	15147	98802	45642150	2969212	107254	...

12 rows x 220 columns

Periods of Time

Period 1: February 18, 2020 to March 22, 2020

- When COVID-19 was first claimed

Period 2: March 23, 2020 to June 8, 2020

- Stock market started to recover

Period 3: June 9, 2020 to October 22, 2020

- The dispersion among stocks increased

Period 4: October 23, 2020 to May 19, 2021

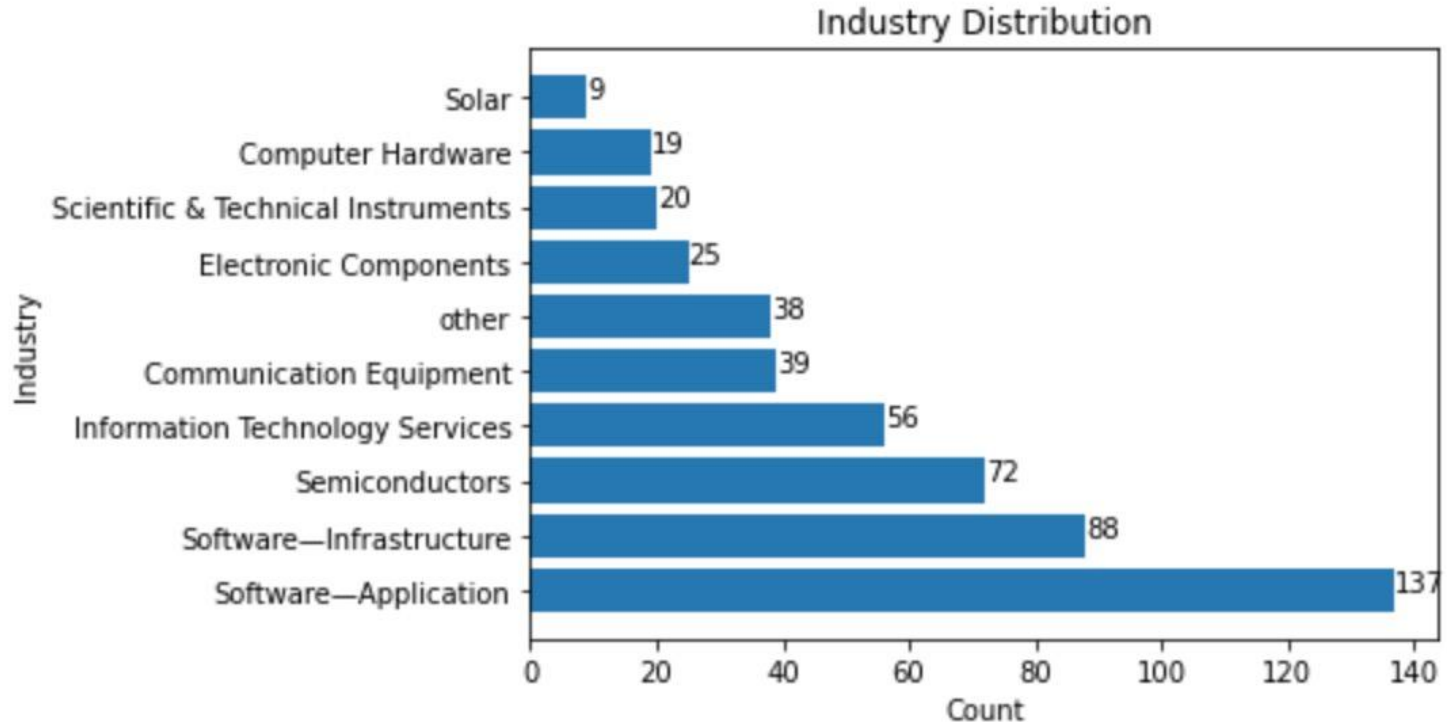
- Introduction of COVID-19 vaccine

Period 5: May 20, 2021 to July 30, 2021

- The first case of Delta variant was confirmed in the US

Exploratory data analysis

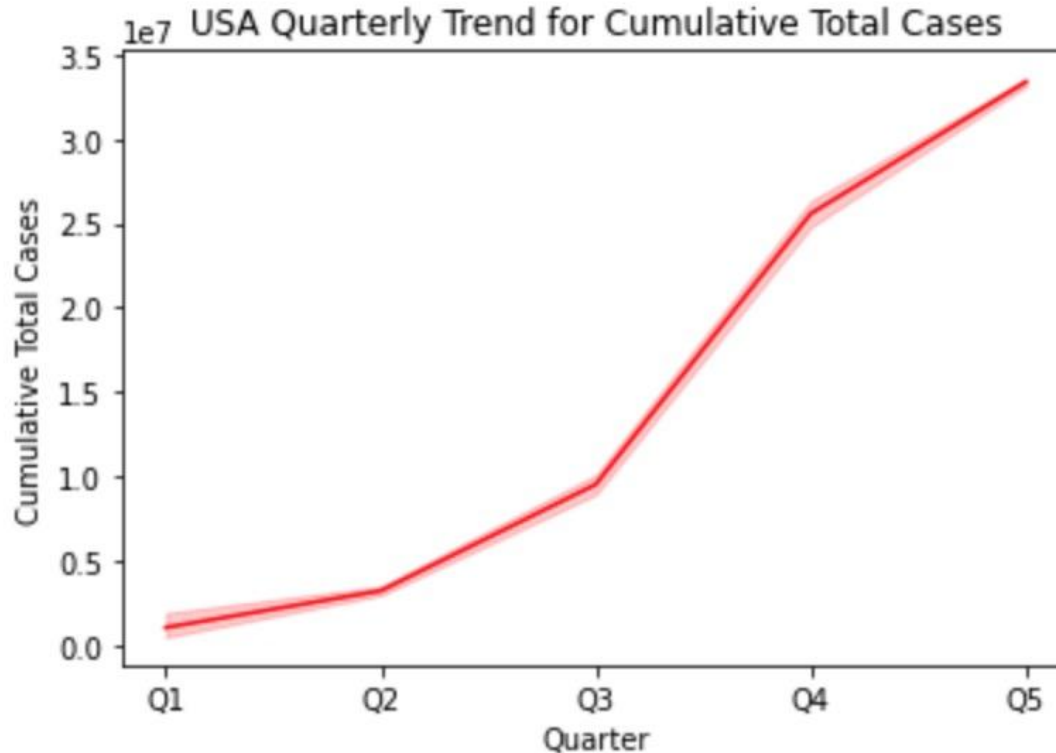
Industry Distribution in the Technology Sector



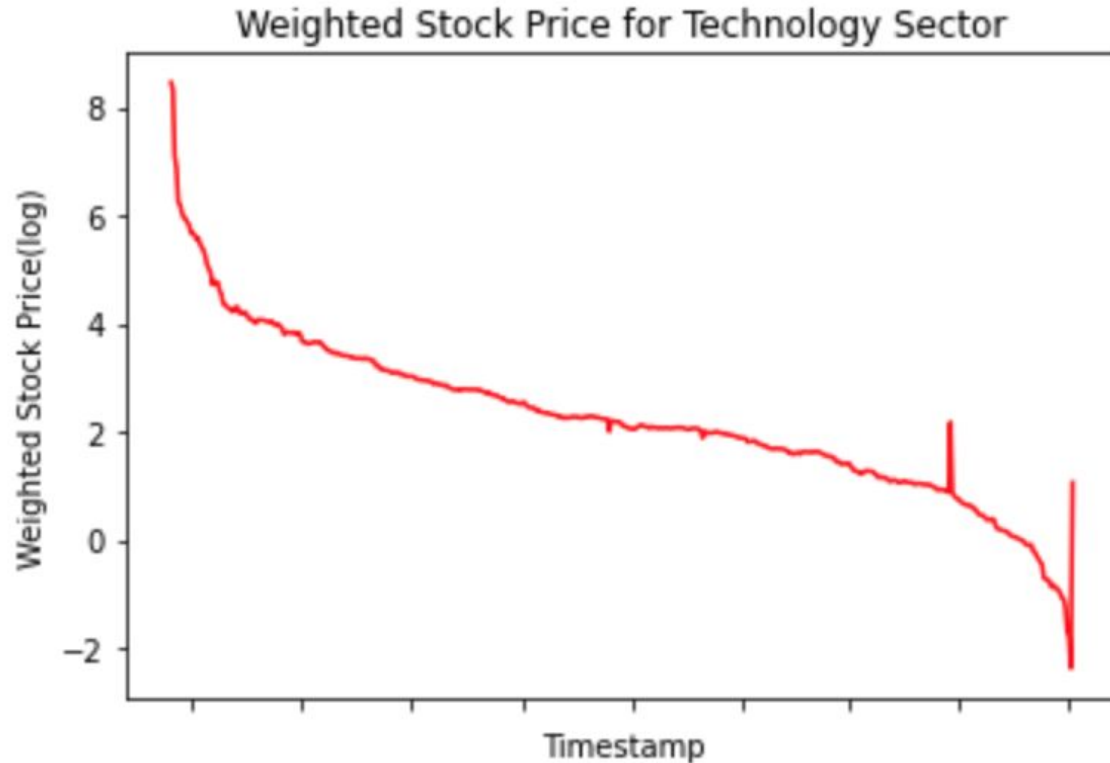
Data Analysis For COVID-19 Cases in the US

	Value
total_confirmed	35733967
total_deaths	629290
total_recovered	29666084
total_cases_per_1m_population	107279
total_deaths_per_1m_population	1889
population	333093143

Trend on Cumulative Total Cases in the US



Changes in Stock Prices Over Time



Summary Table of Company Information

	market_cap(\$M)	market_size	fullTimeEmployees	revenuePerShare	returnOnEquity	fiveYearAvgDividendYield
count	5.030000e+02	503.000000	456.000000	472.000000	393.000000	96.000000
mean	3.171059e+04	3.000000	16457.543860	142.619684	-0.020583	1.953854
std	1.828465e+05	1.417028	49051.536218	1845.565523	1.082114	1.346272
min	3.433800e+01	1.000000	54.000000	0.038000	-17.346120	0.190000
25%	1.660500e+03	2.000000	1050.000000	5.189500	-0.060590	1.082500
50%	4.327000e+03	3.000000	2655.500000	11.763000	0.076700	1.595000
75%	1.342450e+04	4.000000	8575.000000	28.155250	0.181880	2.515000
max	2.944000e+06	5.000000	624000.000000	39192.223000	2.256680	9.670000

Dashboard

Dashboard Heading

COVID-19 Impact On Technology Sector

The COVID-19 outbreak in 2020 has greatly impacted companies in every sector and every industry. However, the impact is not uniform: some companies benefited from and some companies harmed from this global pandemic. The focus of this dashboard is on the technology sector. What this dashboard tries to offer is insight into how different companies and industries in the technology sector are impacted by COVID-19.

Period Selected

Period 5

Total Cumulative Cases

35688506

Date Selected

07/30/2021

COMPANY

INDUSTRY

Dashboard Heading

Date Selected

08/11/2020

←

August 2020

→

Su	Mo	Tu	We	Th	Fr	Sa
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

?

Period Selected

Period 3

Total Cumulative Cases

6949646

Company Tab

Date Selected

07/30/2021

COMPANY

INDUSTRY

Software—Infrastructure

Microsoft Corporation

☒ Stock Price ☐ Daily Percentage Change



Company Overview

index	MSFT
Name	Microsoft Corporation
State	WA
Industry	Software—Infrastructure
Market Cap(\$M)	2572000
# of Employees	181000
Revenue/Share	23.395
ROE	0.49303
5-year Dividend Yield	1.42



Company Tab

Date Selected

07/30/2021

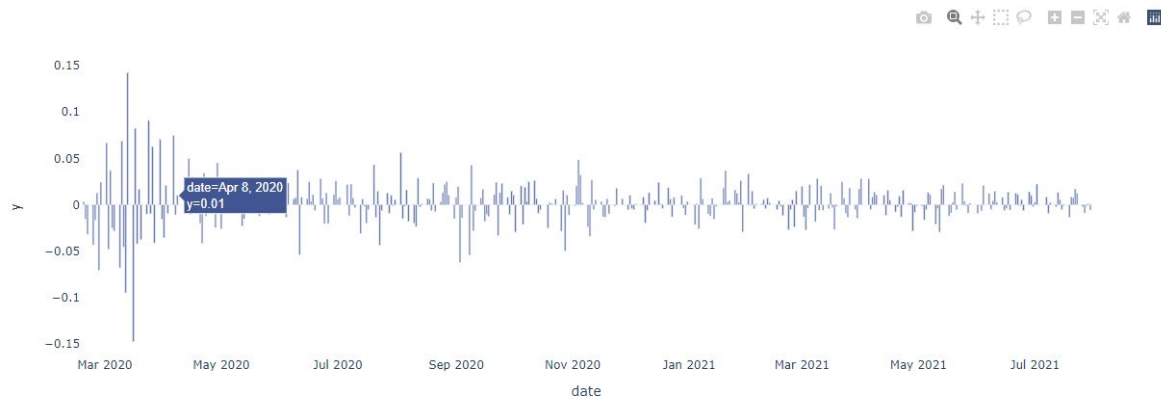
COMPANY

INDUSTRY

Software—Infrastructure

Microsoft Corporation

☐ Stock Price ☒ Daily Percentage Change



Company Overview

index	MSFT
Name	Microsoft Corporation
State	WA
Industry	Software—Infrastructure
Market Cap(\$M)	2572000
# of Employees	181000
Revenue/Share	23.395
ROE	0.49303
5-year Dividend Yield	1.42



Company Tab

ALL

Apple Inc.

Apple Inc.

Microsoft Corporation

NVIDIA Corporation

Taiwan Semiconductor Manufacturing Company Limited

ASML Holding N.V.

Scientific & Technical Instruments

All

☒ Stock Price ☐ Daily Percentage Change

Company Tab

COMPANY

Software—Infrastructure

All

☒ Stock Price ☐ Daily Percentage Change



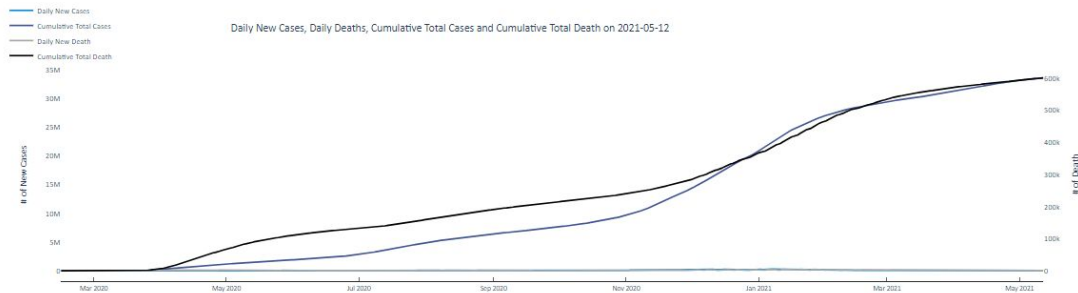
Company Tab



Company Overview

index	SAIL
Name	SailPoint Technologies Holdings, Inc.
State	TX
Industry	Software—Infrastructure
Market Cap(\$M)	4327
# of Employees	1394
Revenue/Share	4.269
ROE	-0.0885
5-year Dividend Yield	

COVID-19 Information



Categories	Value
Daily New Cases	35979
Cumulative Total Cases	33549518
Daily New Death	823
Cumulative Total Death	600040

Industry Tab

Period Selected

Period 3

Total Cumulative Cases

5937075

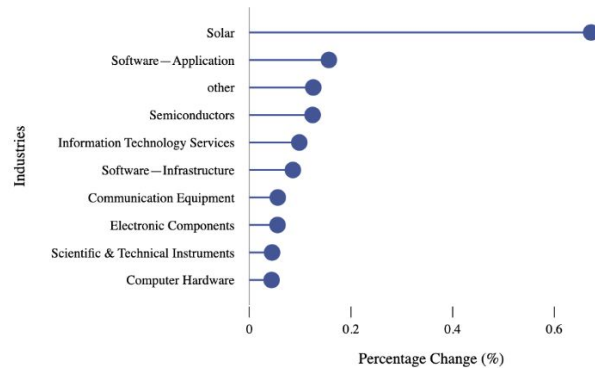
Date Selected

08/21/2020

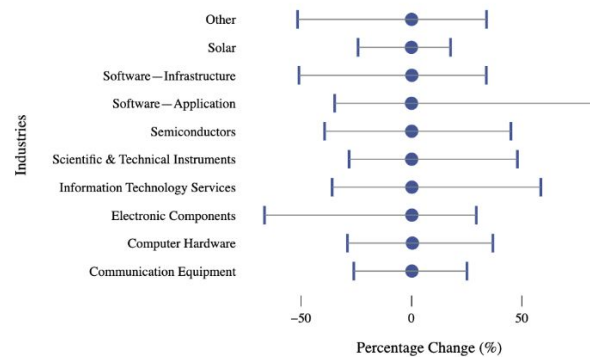
COMPANY

INDUSTRY

Average Daily Percentage Change for Industries during Period 3

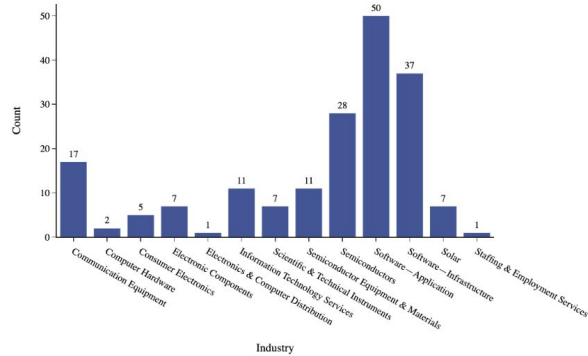


Cumulative Industry Percentage Changes until 2020-08-21

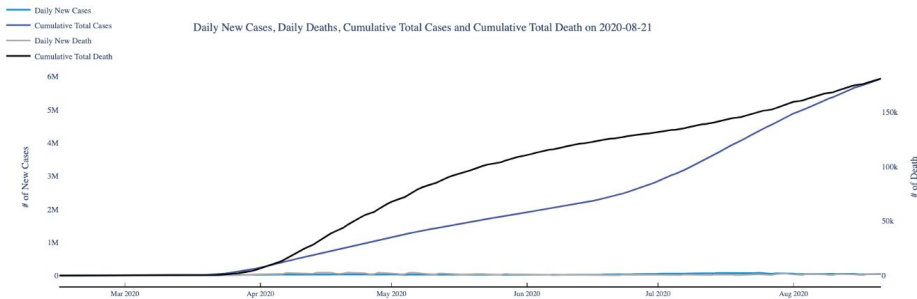


Industry Tab with COVID-19 Graph

Number of Companies Returned to Pre-Covid Level



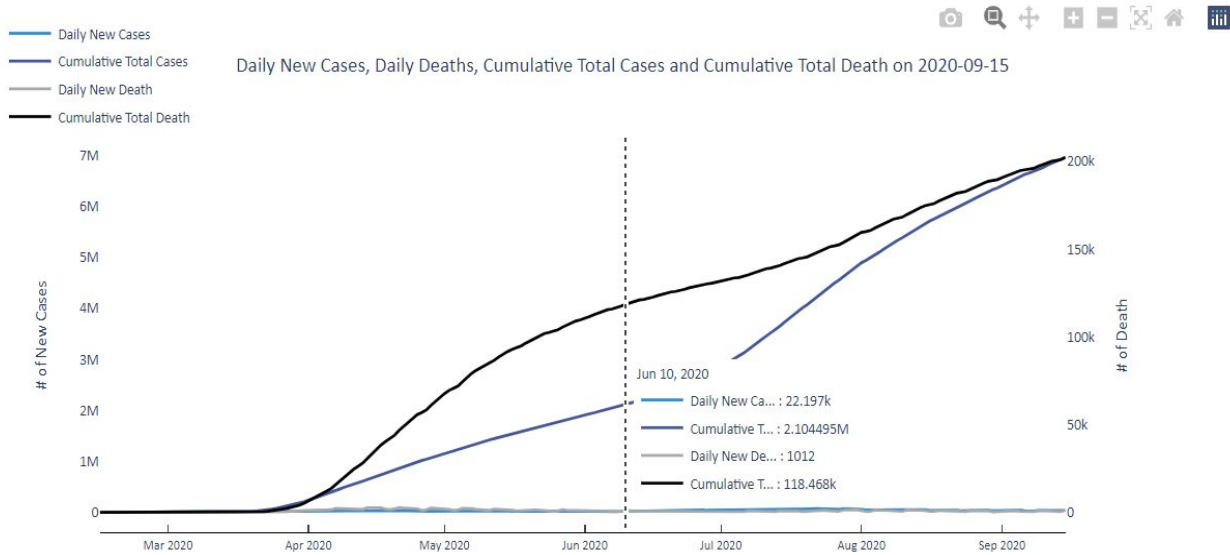
COVID-19 Information



Categoies	Value
Daily New Cases	52617
Cumulative Total Cases	5937075
Daily New Death	1167
Cumulative Total Death	180616

COVID-19 Graph

COVID-19 Information

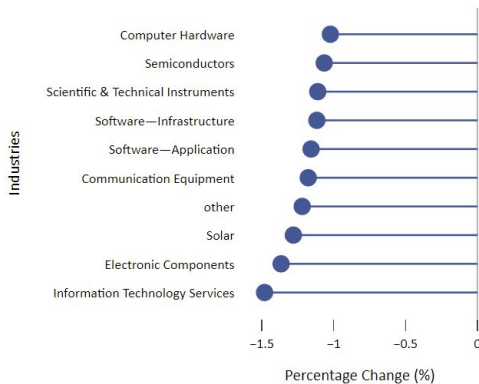


Categoies	Value
Daily New Cases	41008
Cumulative Total Cases	6949646
Daily New Death	1179
Cumulative Total Death	201978

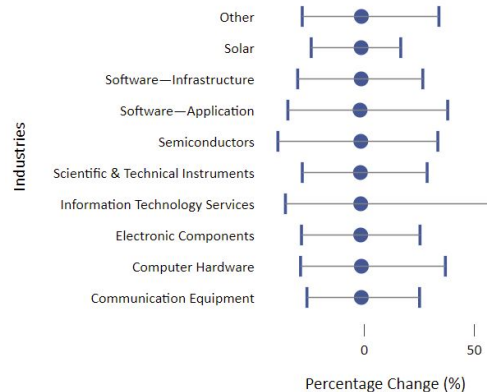
How Users Gain Insights From the Dashboard

- Period 1: February 18, 2020 - March 22, 2020
- Only two companies in software industry have prices higher than pre-COVID level
- Steep increase in number of confirmed cases and deaths

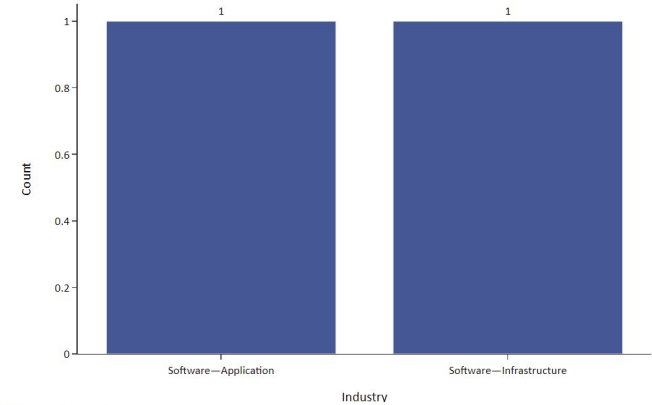
Average Daily Percentage Change for Industries during Period 1



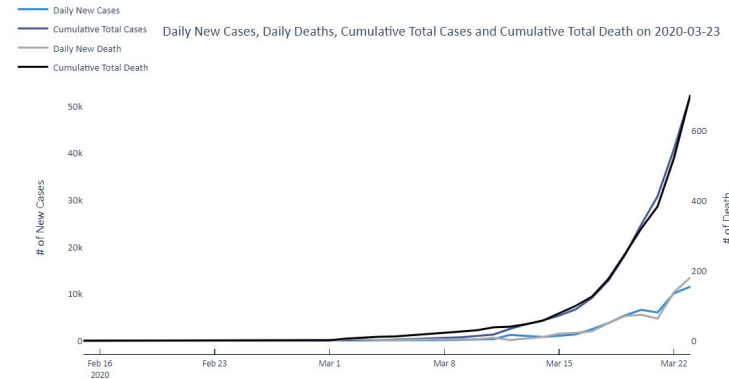
Cumulative Industry Percentage Changes until 2020-03-23



Number of Companies Returned to Pre-Covid Level



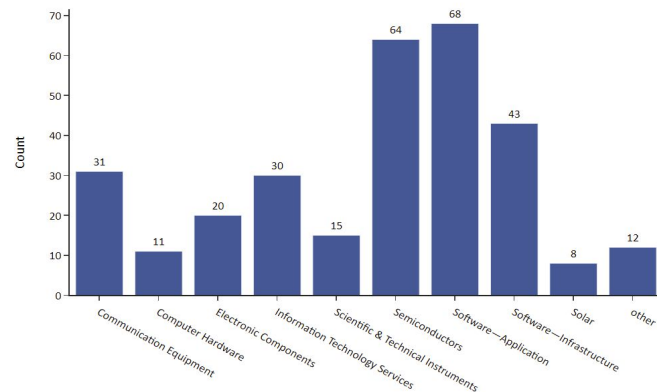
COVID-19 Information



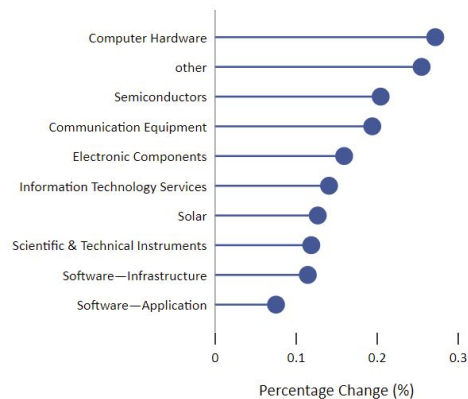
How Users Gain Insights From the Dashboard

- Period 4: October 23, 2020 - May 20, 2021
- Even more companies recovered and returned to pre-COVID level with introduction of Vaccines
- Increases in number of confirmed cases and deaths slowed down and reaching to plateau

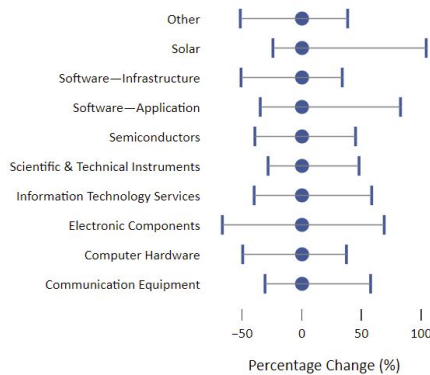
Number of Companies Returned to Pre-Covid Level



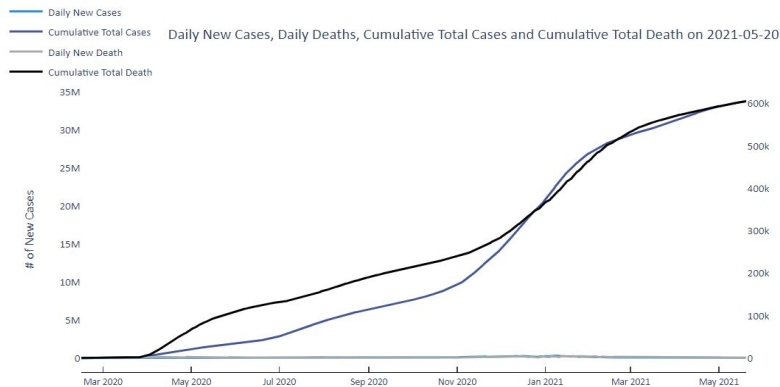
Average Daily Percentage Change for Industries during Period 4



Cumulative Industry Percentage Changes until 2021-05-20



COVID-19 Information





Thank You

References

[https://finance.yahoo.com/screener/predefined/ms_technology/?tsrc=fin-srch
&count=100&offset=500](https://finance.yahoo.com/screener/predefined/ms_technology/?tsrc=fin-srch&count=100&offset=500)

<https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-impact-of-covid-19-on-capital-markets-one-year-in>

<https://www.kaggle.com/josephassaker/covid19-global-dataset>

<https://plotly.com/python/>