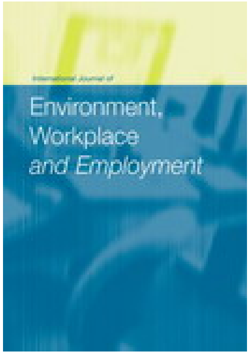


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# The market sentiment and stock market: the case of social media stocks during the COVID-19 pandemic

Amber R. Eisenschenk, Daehoon Han, Jong-Min Kim

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# The market sentiment and stock market: the case of social media stocks during the COVID-19 pandemic

Amber R. Eisenschenk

Psychology Discipline,
Division of Social Science,
University of Minnesota at Morris,
Morris, MN 56267, USA
Email: eisen323@morris.umn.edu

Daehoon Han*

Department of Psychology and Sociology,
Texas A&M University-Kingsville,
Kingsville, TX, 78363-8202, USA
Email: daehoon.han@tamuk.edu
*Corresponding author

Jong-Min Kim

Statistics Discipline,
Division of Science and Mathematics,
University of Minnesota at Morris,
Morris, MN 56267, USA
Email: jongmink@morris.umn.edu

**Abstract:** This research investigates the stocks for various popular social media sites and the correspondence with the social popularity surrounding those sites. The social media companies that had the highest stocks trading activity tended to be sites that also had high components to marketing on their websites, such as Etsy and Meta. The study looked and analysed the fluctuations of stock prices that these social media companies experience over time. With the presence of the COVID-19 pandemic in early 2020, there is evidence of increased popularity and stock price of all researched social media companies. This analysis also looked at the recent effects of Elon Musk's current purchase of the popular social media company, Twitter.

**Keywords:** social media sites; stock price; COVID-19 pandemic.

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**Biographical notes:** Amber R. Eisenschenk finished her undergraduate degree from Psychology Discipline at University of Minnesota-Morris, USA in May 2022. She is working to pursue an MA in Clinical Psychology and a future career in the growing field of mental health professionals.

Daehoon Han is an Associate Professor in the Department of Psychology/Sociology at Texas A&M Kingsville, USA. His main research areas are juvenile delinquency, social deviance and correction.

Jong-Min Kim is a Professor in the Department of Statistics at University of Minnesota-Morris, USA. He has several expertises in statistics, such as statistical genetics, sample survey methods and cluster analysis.

## 1 Introduction

With the introduction of the internet came the prevalence and increase of social media websites, it was quite a few years until these websites became staples in the lives of millions around the world, but the trend of these websites can be observed not only by the impact they make publicly but also the numbers that surround the stocks behind these websites, and some social media companies have drawn the attention of many investors who have been frenzied to invest in their stocks.

This explosive public attention on social media companies is easily anticipated when social media platforms that those social media companies have developed became the major source of people's daily interactions in the 21st century (Carr and Hayes, 2015). In other words, human interactions became more prominent in terms of quantity and quality with the emergence of many social media platforms because this new medium of communication rapidly enlarged the data transformation and make it open for everyone who has any kinds of electronic device to access social media platforms, and social media companies became the provider of essential goods and services that are indispensable to human life.

Thus, it is reasonable to think that social media companies have drawn massive public attention for investment because they are the major players that have developed and operated those popular platforms, such as webs and apps. The more popular platforms are, the more the value of a company is, and it often brought about raising the stock price of those social media companies (Auxier and Anderson, 2021) because the high stock price of a company is recognised by investors as a good place to invest and attract more investors who see its platform as an important app or website to invest in.

This is closely related with one of the contributions that social media platforms make that is to make information spread speedily, so the popular social media platforms not only allow for advertisements in that businesses can use the social platform to increase their audiences, but the social media platforms also make money off the advertisers (Boyd and Ellison, 2007). Thus, the stock price of a company has a direct impact on the security of owning a part of the shares within the company itself and thus the long-time investment of growing shares with the growing worth of the company. In other words, for long-term investors of social media applications like Twitter, Meta, Snapchat, and Pinterest these websites must continue to grow not only in social popularity but also through the investment of advertisements and other monetary methods to guarantee a profit on their stocks.

Furthermore, despite the spread of COVID-19 that resulted in a severe downturn in overall business activity, COVID-19 boosted out the business activity of companies whose business model is mainly made by digitalisation, such as digital trade that have a strong influence on people's daily lives during the COVID-19 pandemic era because of its capability to promote contact-free commercial transaction (Baig et al., 2020; Huang et al., 2020). Therefore, it is also highly possible that a new favourable condition for the business created by COVID-19 pandemic increased the popularity and reputation of many digitally-enabled companies and caused raising their stock price due to the increase in the volume of stock in trade.

Especially, the active business activities by social media companies along with the high stock high stock price of social media companies made a sharp contrast with many other companies based on brick-and-mortal business activities. In addition, the rapid increase in the price of all social media stocks since the start of the COVID-19 pandemic is partially explained by the presence of a worldwide lockdown due to controlling the spread of virus that forced people to spend more time using apps and websites, and the main business activities of social media companies are made through those platforms, so this unprecedented historical events imprinted the importance of social companies for people's daily lives that drew more public interest for investment (Kshetri, 2020).

As a matter of fact, the increased opportunity to keep in contact with relatives and friends during the pandemics started with technological advancements. Hajek and König (2021) argue that the use of social media websites such as Meta helped individuals copes with the COVID-19 situation and that the use of these websites allowed for a temporary substitute for the loss of physical social contact. Hajek and König (2021) also found that older generations that have not had the need and use for social media apps and websites started using these technological advancements to keep in contact with friends and relatives. Consequently, these individuals started to feel better off than when they were not using social media, because they were less likely to experience social isolation. Both old and new users of these applications turned to these popular social media platforms to hinder the effects that isolation could have on many individuals during this difficult time. Isolation can have negative effects on the health and well-being of individuals and thus social media helps negate these effects promoting its popularity.

In order to better understand how the unprecedent changes in social and business condition during the COVID-19 pandemic era affected the popularity and attractiveness of the company leading investor's decision to buy or sell a stock, the current study aimed to analyse the pattern of rally in stock price of social media companies and e-commerce companies that use apps and websites as the main engine of running a business.

Also, the current study focused on Twitter as a case study. Especially, it paid attention to the change in its stock price in the pre- and post-purchase of the social media company from billionaire and owner of Tesla, Elon Musk in April 2022 in order to better understand the impact of the company's popularity on the investor's decision on stock trading. This has been a recent event and it is uncommon for social media platforms to be bought from buyers outside of companies that are already in business. For example, Meta bought Instagram for 1 billion dollars in 2012, and Twitter bought the popular video app Vine also in 2012. Elon Musk bought Twitter for 44 billion dollars, and although there have been many supporters for this transaction, others are unsure what to expect from Elon Musk buying Twitter. Some wait in anticipation to observe if Twitter increases its share worth since the buying of the company, while others might be pulling out of stocks due to the concern.

Before looking into the fluctuation in the stock price of those social media companies, however, previous studies are reviewed to explain factors that draw the attention of investors to a company affecting the stock price of a company so that it helps the readers to better understand the stock rally of those social media companies that are analysed in the section of data analysis.

## 2 Literature review

Generally speaking, the stock price of a company is largely influenced by the business performance of the company that is revealed to the investors because it makes an impact on investors' decision making on whether to invest in the company, and the business performance of a company is measured by several indicators.

The followings are some of indicators to measure the value of a company: net profit margin that shows the company's capability of productive and effective control over its costs (Apsari et al., 2015), return on assets that shows the company's effective use of its assets to maximise profit (Daeli, 2018; Ng et al., 2009), and dept-to-equity ratio that shows the company's capability debt control to maintain the sound level of its cash flow (Asraf et al., 2017; Khan et al., 2017; Ullah et al., 2020). These are the indicators that have the impact on the company's value and functioned as the signal that the investors use to evaluate the company's potential (Ross, 1977). The stock price of a company is influenced by these fundamental factors. However, the stock price can be also changed by a mix of external factors. These factors do not directly impact on the value of a company but indirectly affect the fundamentals of a company's business performance that results in changing the stock price of a company.

One of the external factors that fluctuates the stock price is the government's fiscal policy. For instance, even if the economic activity was hit hard due to the outbreak of COVID-19 pandemic, the stock market was rapidly rebounded, and it was mainly caused by the active government's engagement into the financial market through the enormous level of fiscal stimulus. Especially, the technology stocks became a major beneficiary of the massive fiscal stimulus leading this historically unprecedented stock rally (Banerji, 2020; Winck, 2020).

Another crucial external factor that makes the changes in a company's stock price is the overall strength of the market. Especially, the overall strength of an industrial sector that a certain company is part of determines a company's stock movement when the main business of the company is deeply influenced by and closely connected to the industrial sector that the company belongs to.

Since the disease caused by coronavirus has broken out across the USA, all major stock markets have experienced unprecedented crash in financial history (Tooze, 2020; Georgieva, 2020), and this is mainly caused by the halt of majority of business and consumption activities thanks to the massive efforts of government that attempted to slow the spread of virus through imposing strict lockdown procedures (Leduc and Liu, 2020; Shehzad et al., 2020). However, this market condition did not apply for every industrial sector. Compared to the slump on traditional brick-and-mortar business activities, the business of activities of technology sectors, media, and financial services continued to grow during the era of COVID-19 pandemic (Baig et al., 2020; Okuda and Karazhanova, 2020). For instance, the rise of the consumption activity based on digital connection has enhanced the market dominance of some technology companies, such as Amazon, PayPal, Google, Apple, Microsoft, Meta, Twitter, and other mega-cap tech companies (Sheth, 2020; Blackburn et al., 2020). It led the stock price of digitally intensive sectors to be in the spotlight and drawn a lot of attention from many investors because of the high resilience of the stock prices despite the sharp downturn in non-digitally intensive sectors' stock price in a post-COVID-19 'new normal'. Market sentiment also affects the investor's decision making that impacts on the stock price of a company, and social media itself plays a major role in shaping the market sentiment toward the stock price of a specific company or sector. Market sentiment is the subjective evaluation of investors toward a specific stock (Baker and Wurgler, 2007). It is argued that the stock price of a company sometimes makes an irrational movement because investors often make an investment decision by depending on their subjective intuition or sentiment rather than examining a company's business performance (Rupande et al., 2019; Sayim and Rahman, 2015), and investors is often influenced by news sources that makes the stock price of a company unusually high or low (Bollen et al., 2011; Nofer and Hinz, 2015; Wu, 2015).

As shown by several previous studies, social media is used as a convenient source of sharing information on predicting the company's future stock price because people's attention and sentiments about a company's stock are easily integrated into various social media sites. For instance, there is the close correlation between the amount of posts about a certain company in social media toward and the stock returns in the major stock index, such as the Dow Jones Industrial Average and S&P 500 (Smailovic et al., 2014; Saini and Sharma, 2019) Especially, social media has become an prominent source of people's exchanging information exchange on predicting a company's stock price in COVID-19 era because of the countrywide lockdown that limited people's physical movement (Sul et al., 2017), and it caused stock market to be more turbulent because of the sudden increase and decrease of stock price precipitated by social media postings during the pandemic era (Costola et al., 2021; Chohan, 2021). Furthermore, this 'new normal' in the pandemic era made the role of social media companies on people's daily lives even more significant, and social media companies gained tremendous popularity among many zealous investors because of the rapid increase in the advertising earnings that is heavily influenced by the number of postings and user data.

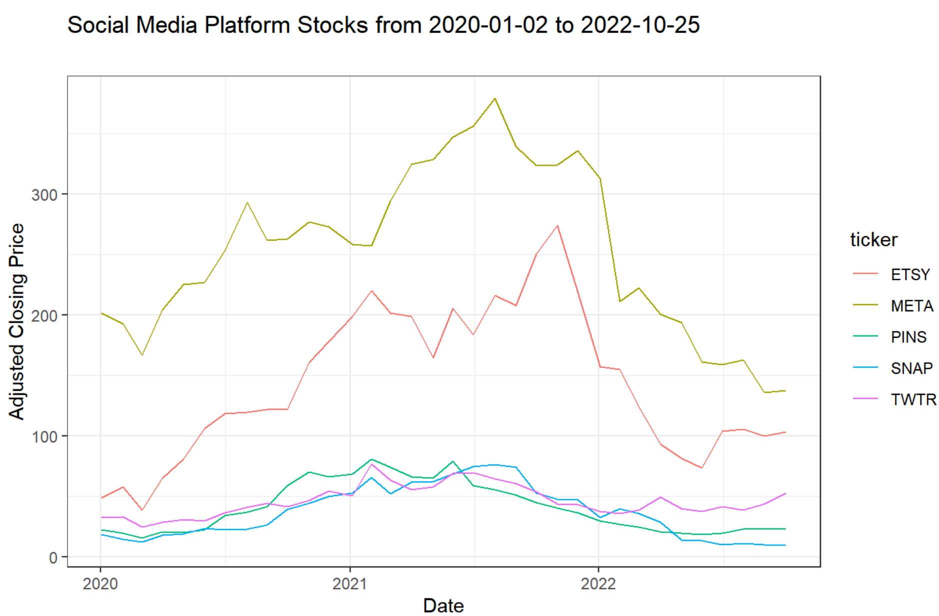
Based on the findings of these extant studies, it is reasonable to argue that the movement of stock is the result of the multiple causal factors that is closely related with the popularity of a certain company that draws attention from some ardent investors. Especially, the COVID-19 pandemic era made the stocks in digitally intensive sectors, such as social media companies, more popular among investors, so the stock price of those companies are forecasted to go up steeply because of the 'new normal' social condition caused by the nationwide lockdown. The following section presents the details of how the popularity of a company affects its stock price by examining the fluctuation in the stock price of the social media companies during the pandemic era.

## 3 Data analysis

### *3.1 The stock price of social media companies during the pandemic*

The purpose of this data analysis was to study the trends and fluctuation of the stock markets of different social media companies in the last two years in order to better understand the impact of a company's popularity on its stock price. The main social media companies observed throughout the analysis are Meta, Twitter, Pinterest, and Snapchat. However, the current study presented the stock price of Etsy that also uses marketing apps and websites as its main resource of making profit because its business model is closely comparable to that of many social media companies. The data used for this research was originally captured from Kaggle, the dataset that looked at the stock prices of five social media platforms from 2012 to 2022. Other data used was the past and current public stock information of four social media websites found on the public site of Yahoo finance, a site that posts quotes and data for analysis to the general public from available public stocks. Analysis of the data was computed through these methods and the use of known and general knowledge of these websites and stocks. Further analysis and information on the prevalence and popularity of social media websites on the behaviours of the public were executed through peer-reviewed articles. The data analysis looks through the top social media sites concerning their closing stocks to show the current highest sites in comparison to the others.

**Figure 1** Plot of social media stock adjusted prices (see online version for colours)

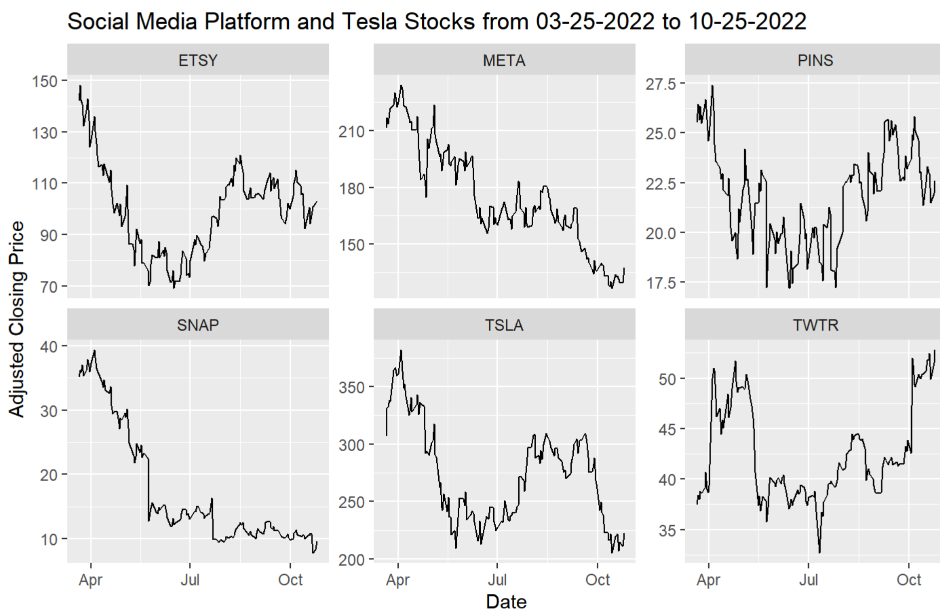



As shown in Figure 1, those social media companies and stand-alone e-commerce companies enjoyed a dramatic increase in their stock prices during the COVID-19 pandemic era, especially in the early to middle parts of 2021 when the corona virus continued to make an enormous impact on every part of social institutions.

For instance, Meta is a typical digital intensive company and successfully utilised the full scale of digitalisation in its profit making by developing a marketing aspect to their websites besides the use of advertisements, such as the Meta Platforms marketplace, and this marketing strategy allows the company to get a share of the profits of individuals selling merchandise on their website. This made Meta highly competitive with not only other social networking companies but also stand-alone marketing companies for the past several years when considering the company value evaluated by long-term investors who look for the stable source (Kepios, 2021). It is also important to note that Meta has the additional popular social media website, Instagram, under their name, which has also recently taken greater measures in not only promoting advertisements but also creating an opportunity to market other business items. This would help explain the overall wealth and value that Meta has accumulated over the past decade.

However, when the nationwide lockdown precipitated by the rapid spread of coronavirus, it led e-commerce to become the major way of commercial transaction replacing the traditional brick-and-mortar type of business. It clearly indicates that digitally intensive companies have dominated every corner of human activity ranging from consumption activity to information exchange to social relationship. It caused Meta has attracted massive interest from many enthusiastic investors helping them enjoying a remarkable increase in terms of stock price compared to the traditional brick-and-mortal business.

**Figure 2** Plots of stock prices




Similarly, many other social media and networking companies also enjoyed a dramatic increase in their stock prices during the pandemic era. The observation from the graph above is the dramatic increase in closing stock price for every company surveyed in this research during the start of the COVID-19 pandemic in the USA in early 2020. While many businesses struggled and lost huge amounts of revenue during this time, it is observed that social media companies tended to thrive during the lockdown. This was shown by a gradual trend of improvement for the stock prices of these online social media companies. Figure 1 shows the highest and lowest recorded closing stock price of these companies. The highest recorded price for these companies occurred in the early to middle parts of 2021, while the lowest recorded price change varied in each company's hitting a low point. The reason for this dramatic increase in popularity and stock price of these companies can be seen through the direct effects that the lockdown had on the social viability of citizens. As stated previously, many individuals turned to social media platforms to negate the effects of social isolation they felt during the lockdown. Taking in greater contact with friends, family, and other such online content reduced the overall effects of isolation and gave individuals something to do during these unprecedented times.

As shown in Figure 2, however, there was also a dramatic decrease in their stock prices during the latter half of 2021 through 2022 after reaching the record high stock price in 2021. Some of these companies lost over 100 to 40 worth in stock closing price. It is partially related to several factors that contributed to dwindling COVID-generated growth in social media sector with leisure time returning to pre-COVID era. In other words, since the lockdown regulations started to lift in 2021, many individuals have spent less time on being put into social media but more time on being put into visiting in-person friends, family, and events, and it became hard for social media companies to bring in windfall revenues and growth that was made by the huge influx of ad spending by consumer-focused brands, such as big-box retailers, to attract the attention of the customer to their products during the pandemic era (Dixon, 2021). Moreover, rising inflation, geopolitical instability, and rising interest rates made the condition of the domestic economy uncertain.

This led investors to be more sceptical about the prospects for the business performance of social media companies making the social media stocks less attractive in the major stock markets, and it resulted in the slump of their stock prices started from the second half of 2021 through 2022 even if majority of social media platforms maintained the steady level of userbase and revenue growth (CB Insights, 2021). However, not all social media companies experienced the downturn in their stock prices. For instance, the closing stock price of Twitter shows the greater improvements in 2022 than other social media and e-commerce companies, such as Pinterest and Etsy, and it is suggested that there are some other factors helping Twitter to entice investors to return investors' attention to the company. The next section describes how Twitter rejuvenated its popularity in 2022 that prevented a sharp drop in its stock price in contrast with other social media companies while focusing on Tesla's decision to purchase Twitter and its impact on the stock price.

## *3.2 Twitter stocks since Elon Musk's purchase*

CEO of Tesla Motors and billionaire Elon Musk told to buy the famous and long-lasting social media website Twitter on 25 April 2022. Musk had been slowly preparing for this purchase with the buying of shares throughout early 2022, acquiring 9.1% of Twitter's shares (Porter, 2022). This was a recent and prevalent event in the tech industry within the stock market, and great attention has been turned to the implications of this deal on Twitter and Tesla's stock prices. Furthermore, it has been greatly interested in observing if there was a great increase in the stock price of Twitter since this purchase and viewing the potential profit or loss for current stockholders in these stocks.

Figure 3 shows the Twitter and Tesla stock adjusted prices from 25 March 2022 to 25 October 2022. It shows that since the purchase comment of Twitter stocks from Elon Musk, Twitter's stock price suddenly soared in the first few days. However, due to Elon Musk's capricious mind over his buyout deal for Twitter, Twitter's stock price went to down in summer of 2022 and became unsteady by the September 2022 because of citing a large number of Twitter fake accounts and inviting a lawsuit from Twitter to close the deal at the original offer price of $44 billion. Recently, after tweeting the buyout comment of Twitter by Elon Musk again, Twitter stock price has been skyrocketing since 5 October 2022, while Tesla stock price has moved opposite direction to Twitter stock price pattern due to the fear of Tesla's future by Elon Musk, and it is suggested that Tesla stock price had not been affected by Twitter buyout issue.

**Figure 3** Plot of Twitter and Tesla adjusted closing prices

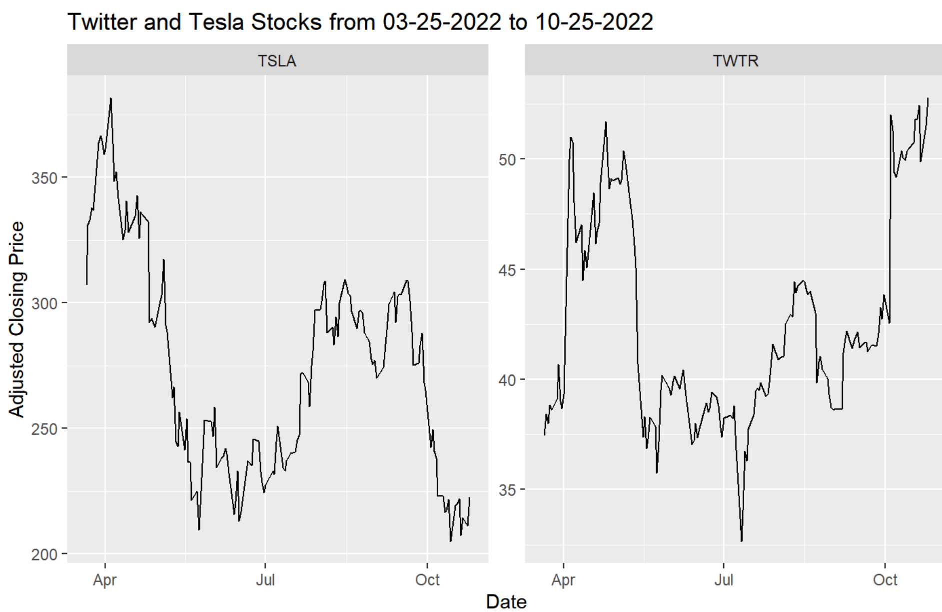
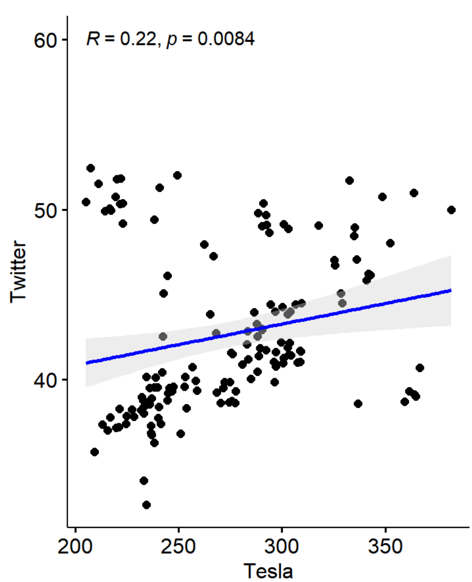


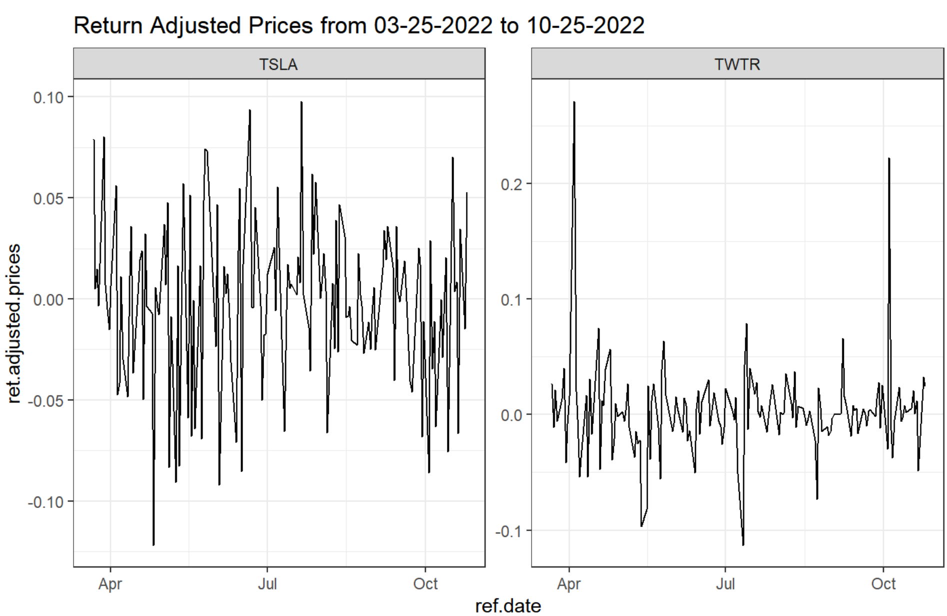

**Figure 4** Correlation of Twitter and Tesla adjusted closing prices (see online version for colours)



We also calculated the Pearson's correlation coefficient between Twitter and Tesla adjusted stock prices in Figure 4. It shows a small positive correlation value (R = 0.22) over the period of the 25 March 2022 to 25 October 2022. However, if Elon Musk really purchases Twitter Inc., then the correlation coefficient may be higher because of these two companies' synergy effect, but it can be bad news to other social media companies because of the increasing market share by Twitter. Elon Musk founded electric car maker Tesla, rocket producer SpaceX, and tunnelling startup Boring Company. These companies are collecting big data information from earth to space so that they need some communication application tool, which can be Twitter social platform. If it is true, then Twitter will corner the market. This may be the main reason that Elon Musk is trying to purchase Twitter Company.

Figure 5 shows the plots of Twitter and Tesla returns. We can find two high positive return peaks from Twitter plot. These two high positive returns on Twitter stock can be explained by Elon Musk's tweets of Twitter buyout on 25 April 2022 and 5 October 2022. However, we can see high negative returns on Tesla stock at these two days. There were negative high returns on Twitter because of Twitter lawsuit against Elon Musk.

**Figure 5** Plots of Tesla and Twitter return adjusted prices




While observing the profits of Twitter is important, it is also important to view the changes that are occurring in Elon Musk's most famous and profiting company, Tesla, in order to measure the impact of the purchase of Twitter on the change in Tesla's profits. Although the decrease in Tesla's profits cannot be solely placed under the purchase of Twitter, it is important to observe the declining profit that Tesla motors are experiencing was partially caused by Tesla's putting resources into Twitter. Further observation should be conducted on both Tesla's and Twitter's stocks during the following months to observe further improvements or losses for both companies and their shareholders.

However, it is important to note that the rise in Twitter's stock price is mainly caused by Tesla's buyout decision rather than Twitter's current corporate performance. It is largely influenced by changes in several conditions that contribute to the market scepticism about the social media industry in 2022, such as the saturation of social media's total addressable user base (eMarketer, 2022), increasingly competitive social media sector, and the seismic shift in macroeconomic condition caused by rising inflation. Especially, if we knew that Twitter's revenue fell by 5% compared with 2021, the positive impact of Tesla's taking over Twitter on its stock price would be more significant to explain the pattern of its stock price in 2022.

## 4 Conclusions

Social media has been a growing field for the past decade, and companies are starting to see the profits and importance of such websites in social communities worldwide. With the overwhelming presence of COVID-19, there has been extreme growth in the understanding of these websites in the social atmosphere and how such websites allow for greater social connection. In a period in which many businesses lost profits, social media companies have only continued to gain profits, and it was the websites of those social media companies that played a major role in this outstanding business success by achieving overwhelming growth in users and profits for their companies because of their leverage over multiple domains and have greatly expanded into marketing features to sell products. Thus, it is argued that the stock price of social media companies in the pandemic era was influenced by the change in the worth of these websites with the amount of business, advertisement, and users that are occurring in the pandemic era, and it is largely explained by that fact that there was an enormous amount of attention among investors toward companies with digitally intensive business model that became more significant in the 'new normal' social environment in the era of COVID pandemic.

Observation of the current situation surrounding Twitter shows that more time will need to pass before major improvements or losses can be observed for the long-term run of Elon Musk's purchase. However, the current state of Tesla and its stocks are decreasing, and further research would need to be conducted to observe the true reason behind this major decrease in stocks.

Despite the findings of the current study, the study should be viewed in light of several limitations. First of all, further research into this topic would be interesting in looking at the closing stocks and the general growth of other popular social media applications, especially TikTok. TikTok was one of the most frequently talked about and used social media sites that grew dramatically during the COVID-19 pandemic. However, the stocks for this application are not public, and thus important analysis could not be done currently. Statista (2022) found that TikTok had a 38% growth rate of worldwide monthly active users from 2019 to 2021, a growth that was the highest for any social media platform during this time. The worldwide growth of this application shows that social media has had major improvements since the start of the pandemic, and the worth of such platforms will continue to grow for years to come. Therefore, it would be better if further research looked closely at the role of digital intensive business model on the change in its stock price. In addition, despite examining the impact of popularity of social media platforms on the changes in the stock price of their companies, it is also necessary to investigate the pattern of a company's stock price that is changed by the collective sentiment of the investors. Especially, further research needs to examine the role of social media on collective how collective sentiment on a specific stock is influence by information exchange in social network platform, such as Reddit.

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