

The Impact of Covid-19 on the Video Game Industry

Authors: Mehmet Deniz Şener(deniz.sener@metu.edu.tr)

Türkan Betül Yalçın (turkan.yalcin@metu.edu.tr)

Supervisor: Assoc. Prof. Dr. Osman Gulseven (gulseven@metu.edu.tr)

Abstract

The covid-19 pandemic has had unexpected consequences for many industries. One of these industries is the video game industry. People increased their time at home, and they turned to play games to socialize and get away from stress. In this study, we aim to examine the effects of Covid-19 on the game industry. In the first part of our study, we discussed the social and psychological effects of games on people during the pandemic period. The share values of essential companies in the gaming industry such as Electronic Arts, Activision-Blizzard, Ubisoft, Capcom, and Take-Two and the number of daily active users and active players of Steam, the digital game platform with millions of users, were examined. We observed that there is a significant increase in the number of active players and users daily. The hypothesis that large companies in the gaming industry increased their share values were established, and this hypothesis was confirmed as a result of the hypothesis tests. We examined the pandemic period, the sector's growth, and the economic dimension of this increase. Due to the increase in the demand for video games, game companies' stock prices are also increasing.

Keywords: Video Game, Electronic Arts, Capcom, Activision-Blizzard, Ubisoft, Take-Two, Covid-19, Stock Price, Gaming Industry

1. Introduction

Coronavirus disease originated in December 2019 (COVID-19) in Wuhan City, China. May 4, 2020, COVID-19 has become a global pandemic with 76.9M people infected and 1.7M deaths, affecting 214 countries, regions, or regions (WHO, 2020). The pandemic and the precautions taken against it have deeply affected our social development (Gulseven et al., 2020). Measures such as wearing surgical masks, physical distance, mass testing, contact tracing, and quarantine have been used to prevent this virus's spread, which meets from person to person in a short time (Sasmita Poudel Adhikari, 2020). In addition to these measures, restaurants, cinemas, entertainment venues, museums, and many social facilities were temporarily closed (Eyeran, 2020). As a result of the measures taken, people's widespread anxiety and stress relief methods have become prohibited or impractical due to physical distance measures. People who go outside cannot properly perform face-to-face interaction due to problems such as not seeing the gestures and hearing the voice clearly due to the mask. People who must stay at home and need social life have had to find other activities to escape the anxiety and stress. Considering all the precautions and problems, video games have become an excellent alternative to escape these troubles (Ko, 2020). In the short term, people's ability to cope with stress thanks to video games (Russoniello, 2009) and social interaction

through online games has increased digital game consumption (Javad, 2020). The digital game industry draws attention as one of the fastest-growing industries globally, also before the pandemic. So much so that the growth rate of the industry has left behind the automotive, energy, and cinema sector, which is the leading entertainment sector (DIGITAL GAMES REPORT 2019, 2019)

During the pandemic, the sector diversified, and the growth rate increased as the number of players increased and new companies entered the market (Katarzyna Szopik-Depczyńska, 2020). For example, Steam, a leading game distributor, reported that it has more than 20 million concurrent active users in its 16-year history at the time of the pandemic, and this number is increasing every day (Stephen, 2020). This increase in the number of players has also changed the games and activities that companies work on. The number of game (mobile game etc.) companies that produce fast games with small teams has increased. Electronic Arts, Activision / Blizzard, Ubisoft, Capcom, Take-Two, are among the most important sector companies. They have enabled these new innovative game companies to enter the market games during the pandemic period and continued to have a say in the sector. These companies, which earn billions of dollars from every game they publish, can be described as the gaming industry's major partners. This study will examine the pandemic's impact on the game industry and major partners of the game industry.

2. Literature Review

The Covid19 outbreak that emerged at the beginning of 2020 negatively affected the health sector and the entertainment industry. Cinemas and theaters were closed to prevent the spread of the epidemic. Many people staying at home turned to home entertainment, and they turned to video games to get away from epidemic stress and have fun. A total of 1.58 million physical games were sold worldwide from March 16 to March 22. This 82 percent overall increase over last week is due to the launch of popular Nintendo Games. (Gough, 2020) WHO recognized this great interest in games and evaluated it to avoid the pandemic. Today, the World Health Organization has begun publishing various messages with the global and wide-ranging gaming industry to slow the spread of covid19. To promote these messages, 18 gaming industry leaders in the entertainment industry launched #PlayApartTogether, an initiative that encourages broad user networks to comply with WHO's sanitary guidelines, including physical distance, hand hygiene, respiratory etiquette, and other decisive preventative actions. This initiative brings special events, awards, and inspiration to some of the world's most popular games, encouraging users to adopt best practices for their health, family, and community. By incorporating COVID-19 self-protection messages into games, the industry can reach millions of people within hours. The message of Activision-Blizzard, one of the leading names in the industry, to the players:

Activision Blizzard - Bobby Kotick, CEO
"It has never been more critical to ensure people stay safely connected. Games are the perfect platform because they connect people through the lens of joy, purpose, and meaning. We are proud to participate in such a worthwhile and necessary initiative." (Johnston, 2020)

Also, the life changes brought about by the COVID-19 pandemic, significantly the increase in online gaming and related activities (e.g., Esports, video game), have also increased the number of times people look at the screen. More recently, WHO (Healthy at Home-Mental health) has recommended a balanced screen time and gameplay. (Dilbaz, 2020) These recommendations and campaigns show that WHO is closely following the increase in the gaming industry.

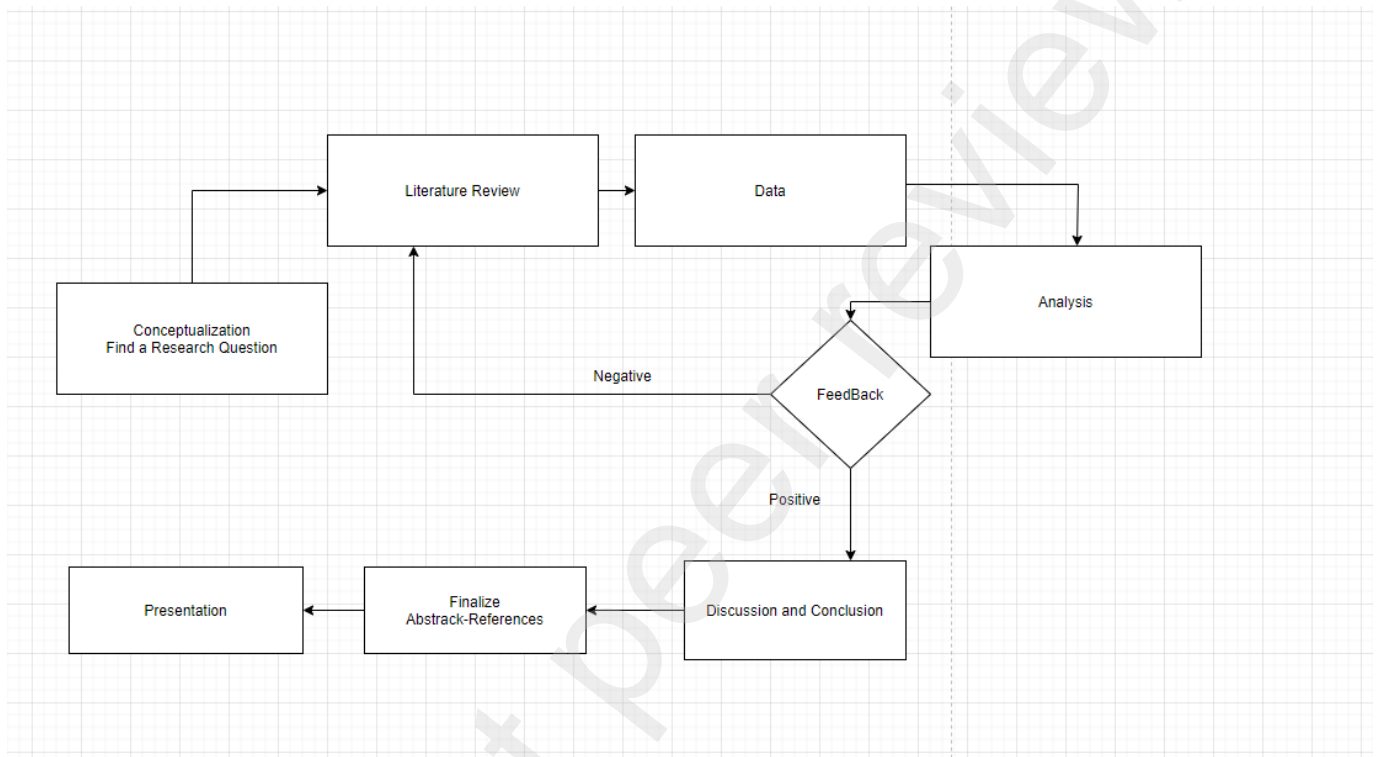
According to a joint analysis by Stream Elements and Arsenal.gg, game streams' global viewership increased by 10% and 15%, respectively, on Twitch and YouTube Gaming compared to the previous week. In Italy, which went through a lengthy quarantine period, it was observed that there was a 66% increase in the consumption of game contents. (Broughton, 2020) Besides Steam, one of the most popular digital PC game markets, hit new heights on Sunday, attracting 20,313,451 concurrent users to the 16-year-old service, according to third-party database SteamDB. Counter-Strike online first-person shooter game published by Steam owner Valve in 2012, Global Offensive seems to have benefited the most from increased engagement and broke the all-time high with 1,023,2290 concurrent players on Sunday, beating its previous high last month. A record-breaking million in April 2016. It makes it one of the most-watched tournaments in the history of e-sports. Call of Duty: Warzone, Activision Blizzard's new free-to-play battle royale spinoff launched on PC, Xbox One, and PlayStation 4 on March 10, pulled a staggering 15 million in three days, making a record 10 million in three days by last year's battle royale sensation made by Electronic Arts (Perez, 2020).

The conditions created by the pandemic have been an excellent success for video game industry giants such as Microsoft and Activision. In April, Microsoft announced that the number of subscribers to the Game Pass service exceeded 10 million. Among these subscribers, Microsoft reported a 130 percent increase in multiplayer interaction in March and April. Twitch, the most popular video game streaming platform, watched 1.49 billion game hours in April, up 50% since March, according to data Arsenal.gg provided by Stream Elements to The Post. Steam, a popular PC gaming platform, reached the highest concurrent user count of all time to more than 20 million in March. According to the NPD, in March, video game sales were close to \$ 1.6 billion, up 35 percent year on year. (Smith, 2020)

We can see this increase in the game industry all over the world. For example, WinZo Games, an Indian-based gaming company, reported three times more user engagement and 30% more traffic. Moreover, 35% higher usage was observed in games played with multiple users. This increase has caused the number of online users to increase much more during the pandemic period. Similarly, Indian mobile-based online gaming platform Paytm First Games reported an almost 200% increase in user base during the pandemic, with 75,000 new users (Kritika Premnath Amin, 2020). Also, Telecom Italia, for example, recently said that "more than 70% increase in Internet traffic over our landline network, with the massive contribution of online games such as Fortnite. Therefore, investments in the sector are showing positive results in the near term. Since people could not predict the pandemic's duration, they turned to spend that can be consumed quickly and not in high amounts. Considering the value of video games, home entertainment has become much preferable (Creutz, 2020).

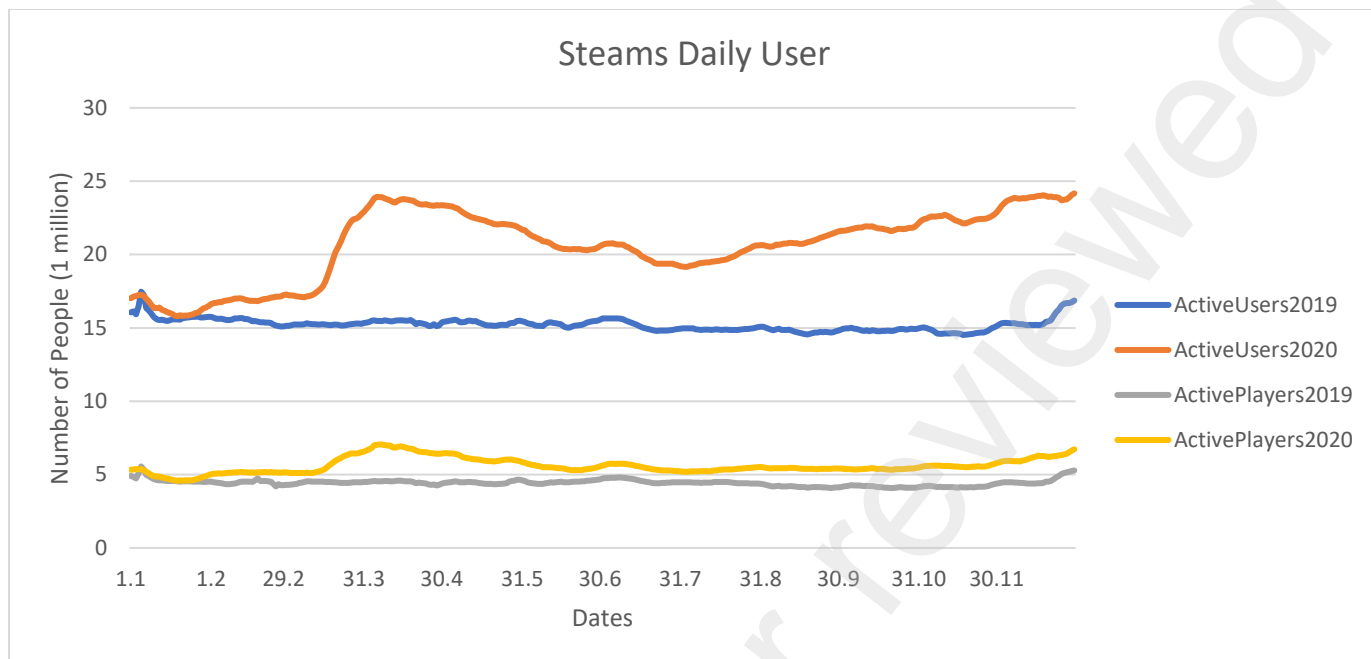
3. Methods

Creating a flow chart is an important step in any scientific study. We prepared our work according to the flowchart shown below.



We started the study by looking for a research question and took the research question, "How did the Covid19 pandemic affect the gaming industry". As a result of our literature review, we continued to analyze Steams user numbers and stock prices of major game companies such as Electronic Arts, Capcom, Activision-Blizzard, Ubisoft, Take-Two. As a result of our analysis, we observed that the number of active players increased rapidly during the pandemic, and gaming companies continued to grow. Later, we wrote the conclusion of our discussion and analysis approved by our teacher. We have completed our work by determining the references we refer to in the APA standards.

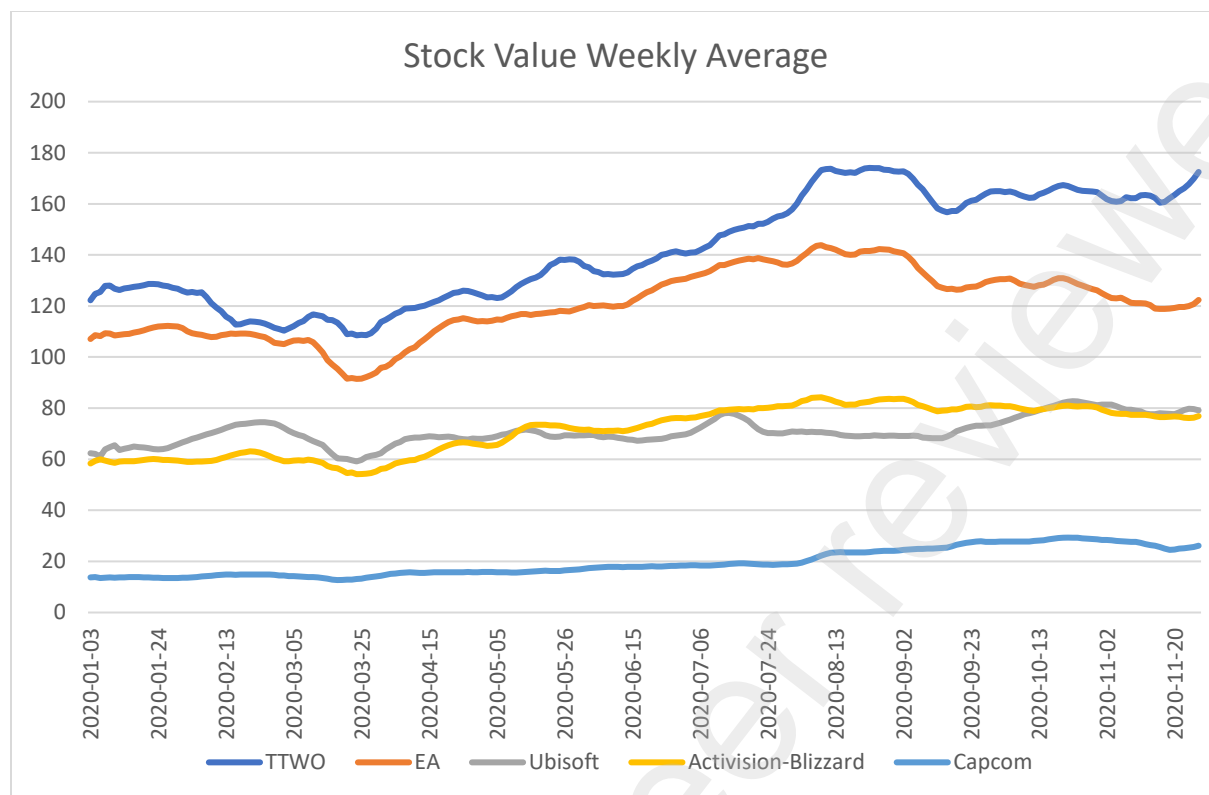
Graph1: Steam Daily User and Player Data



(Data Taken from SteamDB)

In this graph, the number of people actively playing on Steam in 2019 and 2020, and the number of online people but not playing on Steam, as a weekly average. The reason for using the weekly average is to make the chart more understandable. The data shows the data at 00:00 UTC +0 time. As shown in the table, although the number of instant active users of Steam never exceeded the limit of 20 million in 2019, it had rarely dropped below 20 million after March in 2020, and the average number of instant users until December 2020 is 20.4 million. While the average number of people actively playing games in 2019 was 4.4 million, this number increased by 25% in 2020 to 5.5 million.

Graph2: Stock Values of 5 Big Game Companies



(Data Taken from Yahoo Finance)

In the chart above, three companies (Electronic Arts, Ubisoft, and Activision) that released at least one successful game in 2020 and reached high sales (exceeded the \$1 billion thresholds) and two companies (TTWO and Capcom) that did not exceed the \$1 billion thresholds in 2020. share values appear. The change in the companies' share values in December 2020 compared to January 2020 is shown in the table below.

Graph3: % Change in Stock Values of 5 Game Companies from 2020 January to 2020 December

	TTWO	EA	Ubisoft	Activision-Blizzard	Capcom
Change in Stock Price	%47.71	%19.17	%23.22	%36.36	%101.94

(Data Taken from Yahoo Finance)

As shown in the table, all five big companies, successful or not in 2020, managed to increase their stock values. As a result, it can be thought that the time people spend on playing games and the number of people playing games increase the demand for old games. A good example of this is TTWO and Capcom's still high sales of some games released in 2018 and 2019. In addition to these, the old games released before 2020 can be adapted to the newly released PlayStation and Xbox consoles, and the console users have bought the old games to have a better gaming experience.

We have compared the stock values of companies as before April 2020 and after April 2020.

Hypothesis 1

H₀: The number of Steam users did not change during the pandemic.

H₁: The number of Steam users increased during the pandemic.

Treatment 1

N₁: 61

$$df_1 = N - 1 = 61 - 1 = 60$$

M₁: 118.14

SS₁: 3568.1

$$s^2_1 = SS_1 / (N - 1) = 3568.1 / (61 - 1) = 59.47$$

Treatment 2

N₂: 169

$$df_2 = N - 1 = 169 - 1 = 168$$

M₂: 151.25

SS₂: 53165.36

$$s^2_2 = SS_2 / (N - 1) = 53165.36 / (169 - 1) = 316.46$$

T-value Calculation

$$s^2_p = ((df_1 / (df_1 + df_2)) * s^2_1) + ((df_2 / (df_2 + df_2)) * s^2_2) = ((60/228) * 59.47) + ((168/228) * 316.46) = 248.83$$

$$s^2_{M1} = s^2_p / N_1 = 248.83 / 61 = 4.08$$

$$s^2_{M2} = s^2_p / N_2 = 248.83 / 169 = 1.47$$

$$t = (M_1 - M_2) / \sqrt{(s^2_{M1} + s^2_{M2})} = -33.11 / \sqrt{5.55} = -14.05$$

The *t*-value is -14.05059. The *p*-value is < .00001. The result is significant at *p* < .05.

RESULT: The number of Steam users has increased significantly during the pandemic.

Hypothesis 2

H₀: Stock Prices of EA have not increased during the pandemic.

H₁: Stock Prices of EA has increased during the pandemic.

Treatment 1

N₁: 61

$$df_1 = N - 1 = 61 - 1 = 60$$

M₁: 105.06

SS₁: 2997.24

$$s^2_1 = SS_1 / (N - 1) = 2997.24 / (61 - 1) = 49.95$$

Treatment 2

N₂: 169

$$df_2 = N - 1 = 169 - 1 = 168$$

M₂: 126.48

SS₂: 17408.02

$$s^2_2 = SS_2 / (N - 1) = 17408.02 / (169-1) = 103.62$$

T-value Calculation

$$s^2_p = ((df_1 / (df_1 + df_2)) * s^2_1) + ((df_2 / (df_2 + df_2)) * s^2_2) = ((60/228) * 49.95) + ((168/228) * 103.62) = 89.5$$

$$s^2_{M1} = s^2_p / N_1 = 89.5 / 61 = 1.47$$

$$s^2_{M2} = s^2_p / N_2 = 89.5 / 169 = 0.53$$

$$t = (M_1 - M_2) / \sqrt{(s^2_{M1} + s^2_{M2})} = -21.42 / \sqrt{2} = -15.16$$

The t -value is -15.15961. The p -value is $< .00001$. The result is significant at $p < .05$.

RESULT: Stock Prices of EA has increased significantly during the pandemic.

Hypothesis 3

H_0 : Stock Prices of Ubisoft have not increased during the pandemic.

H_1 : Stock Prices of Ubisoft have increased during the pandemic.

Treatment 1

N_1 : 61

$$df_1 = N - 1 = 61 - 1 = 60$$

M_1 : 66.82

SS_1 : 1571.83

$$s^2_1 = SS_1 / (N - 1) = 1571.83 / (61-1) = 26.2$$

Treatment 2

N_2 : 169

$$df_2 = N - 1 = 169 - 1 = 168$$

M_2 : 72.56

SS_2 : 4093.25

$$s^2_2 = SS_2 / (N - 1) = 4093.25 / (169-1) = 24.36$$

T-value Calculation

$$s^2_p = ((df_1 / (df_1 + df_2)) * s^2_1) + ((df_2 / (df_2 + df_2)) * s^2_2) = ((60/228) * 26.2) + ((168/228) * 24.36) = 24.85$$

$$s^2_{M1} = s^2_p / N_1 = 24.85 / 61 = 0.41$$

$$s^2_{M2} = s^2_p / N_2 = 24.85 / 169 = 0.15$$

$$t = (M_1 - M_2) / \sqrt{(s^2_{M1} + s^2_{M2})} = -5.74 / \sqrt{0.55} = -7.71$$

The t -value is -7.70982. The p -value is $< .00001$. The result is significant at $p < .05$.

RESULT: Stock Prices of UBISOFT has increased significantly during the pandemic.

Hypothesis 4

H_0 : Stock Prices of Activision-Blizzard have not increased during the pandemic.

H₁: Stock Prices of Activision-Blizzard have increased during the pandemic.

Treatment 1

N₁: 61

$$df_1 = N - 1 = 61 - 1 = 60$$

M₁: 58.98

SS₁: 440.35

$$s^2_1 = SS_1 / (N - 1) = 440.35 / (61-1) = 7.34$$

Treatment 2

N₂: 169

$$df_2 = N - 1 = 169 - 1 = 168$$

M₂: 76.23

SS₂: 6589.45

$$s^2_2 = SS_2 / (N - 1) = 6589.45 / (169-1) = 39.22$$

T-value Calculation

$$s^2_p = ((df_1 / (df_1 + df_2)) * s^2_1) + ((df_2 / (df_1 + df_2)) * s^2_2) = ((60 / 228) * 7.34) + ((168 / 228) * 39.22) = 30.83$$

$$s^2_{M1} = s^2_p / N_1 = 30.83 / 61 = 0.51$$

$$s^2_{M2} = s^2_p / N_2 = 30.83 / 169 = 0.18$$

$$t = (M_1 - M_2) / \sqrt{(s^2_{M1} + s^2_{M2})} = -17.25 / \sqrt{0.69} = -20.8$$

The *t*-value is -20.79637. The *p*-value is < .00001. The result is significant at *p* < .05.

RESULT: Stock Prices of Activision-Blizzard has increased significantly during the pandemic.

Hypothesis 5

H₀: Stock Prices of Capcom have not increased during the pandemic.

H₁: Stock Prices of Capcom have increased during the pandemic.

Treatment 1

N₁: 61

$$df_1 = N - 1 = 61 - 1 = 60$$

M₁: 14.01

SS₁: 41.06

$$s^2_1 = SS_1 / (N - 1) = 41.06 / (61-1) = 0.68$$

Treatment 2

N₂: 169

$$df_2 = N - 1 = 169 - 1 = 168$$

M₂: 21.74

SS₂: 3936.71

$$s^2_2 = SS_2 / (N - 1) = 3936.71 / (169-1) = 23.43$$

T-value Calculation

$$s_p^2 = ((df_1 / (df_1 + df_2)) * s_1^2) + ((df_2 / (df_2 + df_2)) * s_2^2) = ((60/228) * 0.68) + ((168/228) * 23.43) = 17.45$$

$$s_{M1}^2 = s_p^2 / N_1 = 17.45 / 61 = 0.29$$

$$s_{M2}^2 = s_p^2 / N_2 = 17.45 / 169 = 0.1$$

$$t = (M_1 - M_2) / \sqrt{(s_{M1}^2 + s_{M2}^2)} = -7.72 / \sqrt{0.39} = -12.38$$

The t-value is -12.37769. The p-value is < .00001. The result is significant at $p < .05$.

RESULT: Stock Prices of Capcom has increased significantly during the pandemic.

None of the hypotheses are rejected. Hence all of the companies have increased their stock prices in a statistically significant manner during the pandemic.

4. Results

We examined five game companies' stock prices in 2020 and daily user statistics of Steam in 2019 and 2020. We assumed that game producer and publisher companies had decreased their stock prices during the pandemic due to delaying release dates of games due to hard and inefficient conditions of remote working. Games that were published during the pandemic mostly accused of being buggy or the same as the other games. Despite the game industry's problems, our study showed that game companies had increased their stock prices during the pandemic.

We showed that Steam, one of the most popular game platforms, has increased its active users by more than 20% during the pandemic, increasing demand for games. In conclusion, our hypothesis tests showed that game companies increased their stock prices during the pandemic, unlike our expectations.

5. Discussion and Conclusion

COVID-19 is an epidemic that originated from Wuhan, China, on December 19, 2019, and caused many deaths. The measures taken to control virus spread have changed the lives of many people. During the pandemic, the social lives of people who were kept indoors and away from their friends and family were adversely affected, and lack of social life and pandemic psychology brought stress. To cope with this stress and forget about the pandemic, many people turned to video games. With the increasing number of players, the demand for video games has also increased. With the increasing demand, new companies and games entering the sector increased rapidly.

The gaming industry, which is accessible from home, is cheap compared to other entertainment sectors and has a wide variety of markets, has become one of the most preferred sectors. As we have shown in the methodology section, Steam, one of the largest digital gaming platforms globally, has increased daily users by more than 20% during the pandemic. This increase has occurred not only on the computer where Steam is located but also on console and mobile games. The new generation Xbox and PlayStation consoles that came out towards the end of 2020 caused a sudden leap in the game world. Also, Electronic Arts, Activision / Blizzard, Ubisoft, Capcom, Take-Two, which are among the gaming industry leaders, have released games that will affect the industry and acted strategically during the pandemic period. If we examine them:

Although Take-Two Interactive could not achieve the success it wanted with the games it released in 2020, it managed to sell over 1 million extra copies by offering the cheap online version of Red Dead Redemption 2, which was released in 2018. For gamers who do not want to spend \$60 to play story-based games and love multiplayer games (Steam Spy, 2020). Another reason for Take-Two Interactive's 47% increase compared to last year may be the GTA 6 game announced. Considering that the previous game in the series sold more than 130 million units, we can say that investors and the company have high expectations from the new game.

Electronic Arts, which both released successful games in 2020 and is compatible with the new paid subscription system's many digital game platforms, managed to increase its share value by 20%. In this subscription, which is in the style of Netflix, Electronic Arts have established a system where users can play their products if they subscribe instead of selling them. They have also managed to increase their dominance in the market by collaborating with Microsoft Studios, one of the market's biggest competitors (Aygünoğlu, 2020).

Ubisoft and Activision-Blizzard and have managed to increase the value of the successful games they published throughout the year by using the micropayment systems effectively in their games. Capcom, on the other hand, managed to increase the demand with the new games announced in 2020. The fact that game companies continue to grow by effectively managing the pandemic attracts their investors' attention. New investments in the industry and innovative gaming companies are increasing every year. With the change in people's understanding of entertainment, the interest in the game industry will not be limited to the pandemic, and the market power of the sector will increase.

References:

- Aygünoğlu, H. (2020). *Microsoft ve EA'dan müthiş iş birliği: EA Play, Xbox Game Pass'e dahil oluyor*. Donanım Haber: <https://www.donanimhaber.com/microsoft-ve-ea-dan-muthis-is-birligi-ea-play-xbox-game-pass-e-dahil-oluyor--124932>
- Broughton, M. (2020, 03 19). *Tencent Revenue Up 21%; Video Game Usage Rises Amid Covid-19*. TheGamingEconomy: <https://www.thegamingeconomy.com/2020/03/19/tencent-revenue-up-21-video-game-usage-rises-amid-covid-19/>
- Creutz, D. (2020, 03 16). *VIDEO GAMES AND COVID: IN WHICH WE STATE*. Cowen: <https://cowen.bluematrix.com/sellside/EmailDocViewer?encrypt=511852dd-fc31-49b8-8870-277abe4f1526&mime=pdf&co=Cowen&id=georg.szalai@thr.com&source=mail>
- DİJİTAL OYUNLAR RAPORU 2019. (2019). Dijital Oyun Raporu 2019. *Güvenli İnternet Merkezi*.
- Dilbaz, Ö. K. (2020, 08). *COVID-19 Pandemisinde Bağımlılık*. ResearchGate: https://www.researchgate.net/publication/343944385_COVID-19_Pandemisinde_Bagimlilik
- Eyerman, N. D. (2020). Covid-19 as cultural trauma. *American Journal of Cultural Sociology*.

- Gough, C. (2020, 06 18). *COVID-19: global video game and console increase as of March 2020*. Statista: <https://www.statista.com/statistics/1109979/video-game-console-sales-covid/>
- Gulseven, O., Al Harmoodi, F., Al Falasi, M., & ALshomali, I. (2020). How the COVID-19 Pandemic Will Affect the UN Sustainable Development Goals?. *Available at SSRN* 3592933.
- Javad, J. (2020, 03 27). <https://www.wfaa.com/>. <https://www.wfaa.com/article/sports/esports-gaming-industry-thriving-as-video-games-provide-escape-from-reality-during-coronavirus-pandemic/287-5953d982-d240-4e2b-a2ba-94dd60a8a383>
- Johnston, K. (2020). *Games Industry Unites to Promote World Health Organization Messages Against COVID-19; Launch #PlayApartTogether Campaign*. <https://www.businesswire.com/>: <https://www.businesswire.com/news/home/20200328005018/en/Games-Industry-Unites-Promote-World-Health-Organization>
- Katarzyna Szopik-Depczyńska, A. K.-S. (2020). Application of crowdfunding to video game projects financing. *Procedia Computer Science*.
- Ko, C.-H. (2020). Impact of COVID-19 on gaming disorder: Monitoring and prevention. *Journal of Behavioral Addictions*.
- Kritika Premnath Amin, M. D. (2020, 07 10). *LinkSpringer*. Online Gaming During the COVID-19 Pandemic in India: Strategies for Work-Life Balance: <https://link.springer.com/article/10.1007/s11469-020-00358-1>
- Perez, M. (2020, 03 16). *Video Games Are Being Played At Record Levels As The Coronavirus Keeps People Indoors*. Forbes: <https://www.forbes.com/sites/mattperez/2020/03/16/video-games-are-being-played-at-record-levels-as-the-coronavirus-keeps-people-indoors/?sh=607fed0d57ba>
- Russoniello, C. (2009). The effectiveness of casual video games in improving mood and decreasing stress. *Journal of Cyber Therapy and Rehabilitation*.
- Sasmita Poudel Adhikari, S. M.-J.-P.-X.-Z. (2020). Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. *Infectious Diseases of Poverty*.
- Smith, N. (2020, 05 12). *The giants of the video game industry have thrived in the pandemic. Can the success continue?* WashingtonPost: <https://www.washingtonpost.com/video-games/2020/05/12/video-game-industry-coronavirus/>
- Steam Spy. (2020). *Steam Spy*. Steam Spy: <https://steamspy.com/app/1404210>
- SteamDB. (2020). *SteamDB*. SteamDB: <https://steamdb.info/>
- Yahoo. (2020). *Yahoo Finance*. Yahoo: <https://finance.yahoo.com/>

Yalçın, Şener. (2020, 11). *How to prevent the spread of COVID-19 at common eateries? A Century-Old Lesson from Colonel Cummings*. ResearchGate: https://www.researchgate.net/publication/346652889_How_to_prevent_the_spread_of_COVID-19_at_common_eateries_A_Century-Old_Lesson_from_Colonel_Cummings