

# An Analysis of Video Games Sales from 1980 to 2016

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June 12, 2022

## 1 Introduction

How has video game consumption changed over time? In this analysis, we will take a look at global sales of video games and look for trends. Are there better sales for certain video game genres, platforms, publishers, or critic scores? We'll observe what top video games have in common to learn more about the average video game consumer. Finally, we'll compare video game sales across the globe to see how interest for video games is different depending on the region.

## 2 Discussion of the Data Set

The data set we will use for this analysis has been taken from Kaggle. The data set was web scraped from VGChartz [1]. The data set includes 16,719 video games with 16 columns. The columns that we will be using include: Name, platform, year of release, genre, publisher, NA sales, EU sales, JP sales, other sales, global sales, critic score, and ESRB rating. The sales are given in millions, and we have sales data for North America, Europe, Japan, and "other" which includes sales for the rest of the world, i.e. Africa, Asia but excluding Japan, and excluding Australia. We have data for video games released from 1980 to 2016. The critic score has been taken from Metacritic, however not all video games have Metacritic scores.

### 2.1 Data Set Cleaning

In the data set, we are primarily given data for video games released from 1980 to 2016. However, the data set includes three observations for video games released in 2017 and one observation for a video game released in 2020. These observations are inaccurate and will affect our analysis, so we will remove these observations from the data set.

## 3 Findings

We will answer three research questions pertaining to how sales in video games changed over time, similar features of top selling video games, and differing interests in video games according to region.

### 3.1 Video Game Sales

We will first take a look at video game count by year. As shown in Figure 1, we see there is a much higher concentration of video games released after 2005 compared to the years before 1995. This is likely due to an increased interest and demand for video games.

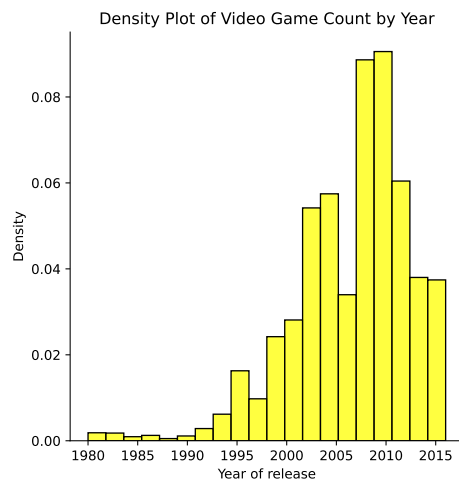


Figure 1: Density plot of video game count by year.

Figure 2 shows global sales for video games by year. Global sales greatly rose from 1980 to 2008 and has quickly decreased from 2008 to 2016. In 1980, global sales were about 11 million, and it has peaked in 2008 with about 672 million global sales. In 2016, global sales dropped to about 130 million global sales. The drop in sales may be caused from a reduced interest in video games, or possibly less interest in the newer generation of video game consoles.

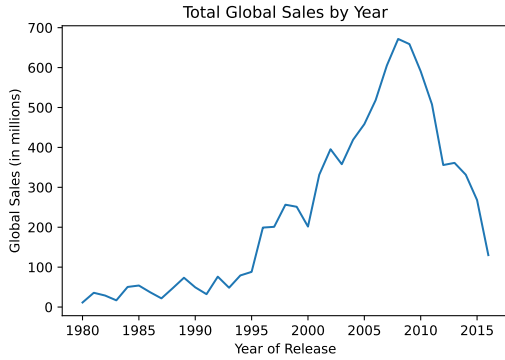


Figure 2: Line chart that depicts global sales for video games by year.

We continue the analysis by looking at global sales by publisher, ESRB rating, platform, and Metacritic score. Figure 3 shows that the top three video game genres produced are action, sports, and miscellaneous genre games. According to Figure 4, action, sports, and shooter games are the genres that account for most of the global sales. In total, action games have sold just under 1,750 million units while sports games have sold about 1,300 million units, and shooters have sold about 1,100 million units.

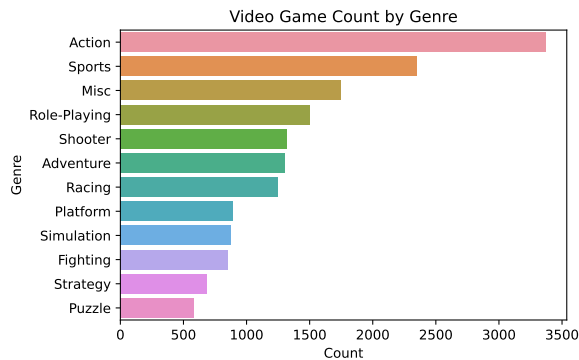


Figure 3: This bar chart that shows video game count by genre.

Figure 5 shows the top producers of video games are Electronic Arts, with about 1,400 million units produced, Activision with about 950 million units, and Namco Bandai Games with about 900 million units. However, Figure 6 shows the top video game sellers are Nintendo, Electronic Arts and Activision. Nintendo has relatively sold the most units with about 1,750 million units sold, while Electronic Arts and Activision sold about 1,150 million units and 750 million units, respectively.

Figure 7 shows video game global sales by ESRB

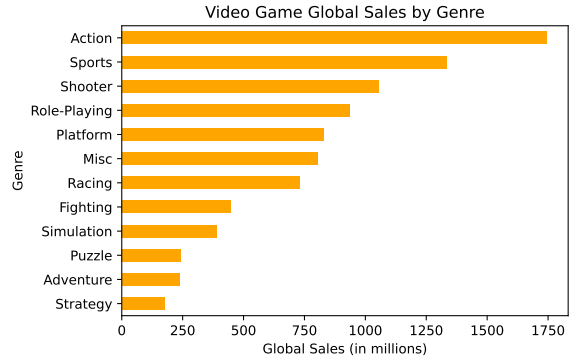


Figure 4: This bar chart shows global sales by genre.

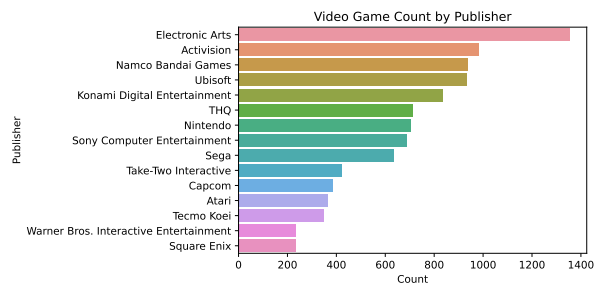


Figure 5: This bar chart shows video game count by publisher.

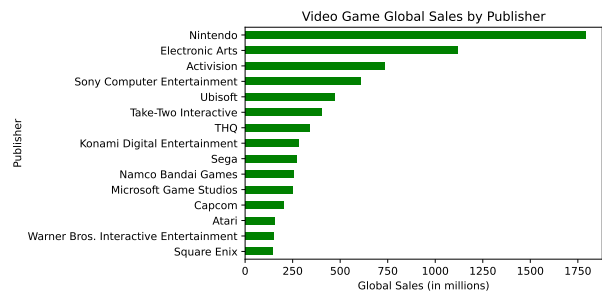


Figure 6: This bar chart shows global sales by publisher.

rating. Not surprisingly, rated E games account for most of the global sales of just under 2,500 million units sold. Figure 8 shows the PS2 accounting for most of the global sales, with about 1,200 million units of PS2 video games sold. Games for the Xbox 360, PS3, and Wii trail behind sales with about 950 million, 940 million, and 930 million units, respectively

We will now take a look at Metacritic scores to see if it's related to global sales. We will take a look at the average global sales for each Metacritic score.

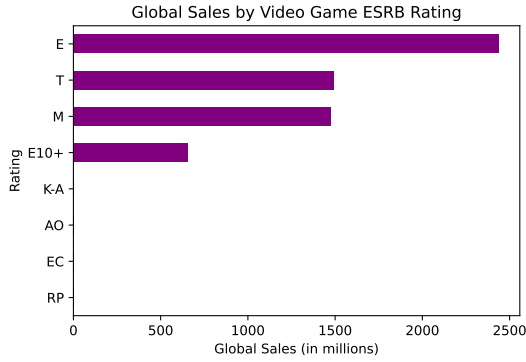


Figure 7: This bar chart shows global sales by ESRB rating.

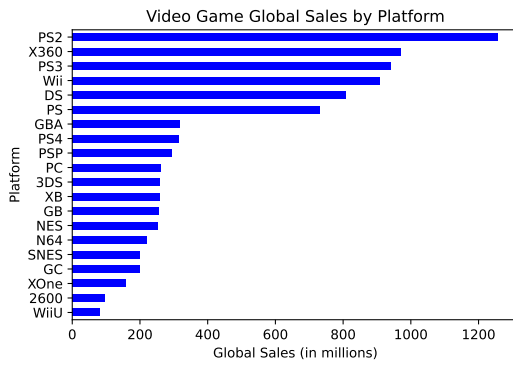


Figure 8: This bar graph shows global sales by the platform the video game was released for.

The plot is shown in Figure 9. We see that as the Metacritic score increases, the global sales increase. This is what we expect, because a more popular video game will most likely result in a better critic score.

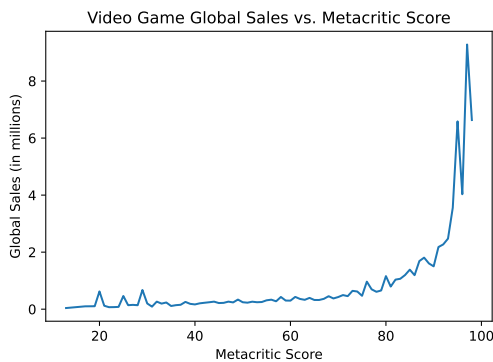


Figure 9: We take the average global sales for each Metacritic score, and make a time plot to show the effect of Metacritic scores on global sales.

### 3.2 Top Selling Video Games

Now let's take a look at the video games that have the highest global sales. We will look at the top 100 highest global selling video games and observe their similarities and differences.

According to Figure 10, the most popular genres are shooters, platform, and role-playing, with 21 games being shooters, 16 as platform, and 15 as role-playing. Most of the top selling video games have been released in between the years 2005 and 2015 (Figure 11). Figures 12 and 13 show that a significant majority of the top 100 best global selling video games are released from Nintendo. Furthermore, of the top 100 video games, Nintendo has globally sold the most units of all video game publishers.

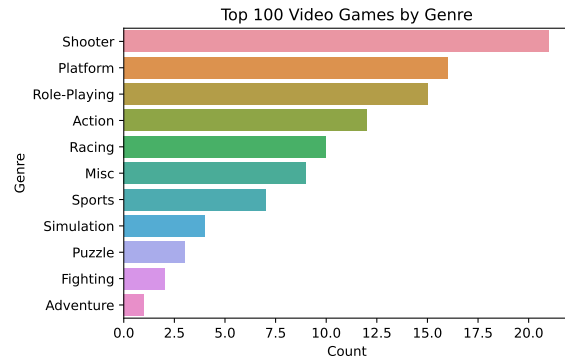


Figure 10: This bar chart shows the 100 best global selling video games by genre.

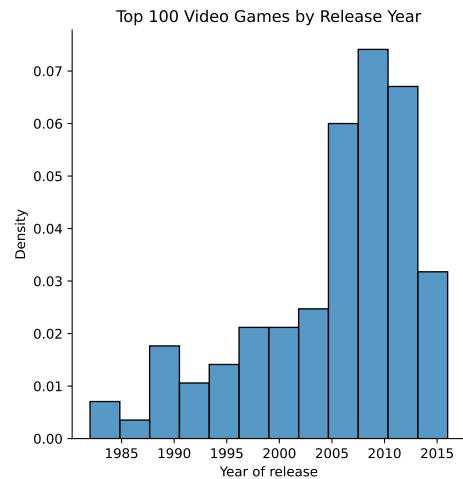


Figure 11: This histogram shows the year of release for the 100 best global selling video games.

According to Figure 14, of the top 100 video games, 30% of them are rated E and 26% are rated M, while

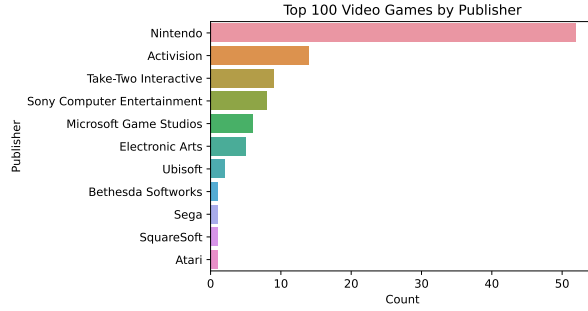


Figure 12: This bar chart shows the 100 best global selling video games by publisher.

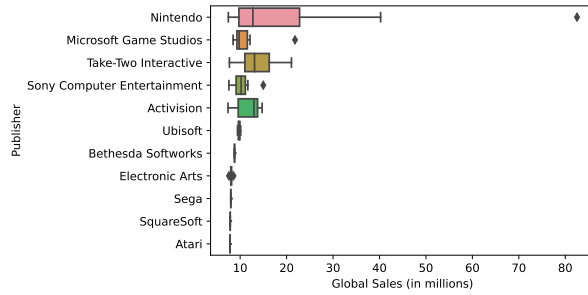


Figure 13: Box plot of global sales for the top 100 best global selling video games by publisher.

only 6% are rated T and 2% are rated E10+. This agrees with our findings since we found a majority of the top video games are released by Nintendo, which makes mostly rated E games, and many of the top selling games are shooters, which is more likely to be rated M. We take a look at Figure 15 and observe that the best selling video games were made for the Wii, Xbox 360, and the DS, released in 2006, 2005, and 2004, respectively (Wikipedia [2]). This makes sense because we recall in Figure 2 that there was a huge rise in video game consumption from 2004 to 2009.

Now we examine the Metacritic scores for the top video games. Figure 16 demonstrates a left-skewed relationship between Metacritic score and density. This relationship makes sense because we expect higher Metacritic scores for video games that have high global sales. We can compare Figure 16 with Figure 17. Figure 17 shows the distribution of Metacritic video games for our entire video game data set. The median Metacritic score for all video games is about 74 while the median Metacritic score for the top 100 best global selling video games is approximately 88, which is much higher.

Figure 18 shows the top 10 best selling video games and their global sales. We see that *Wii Sports* has the

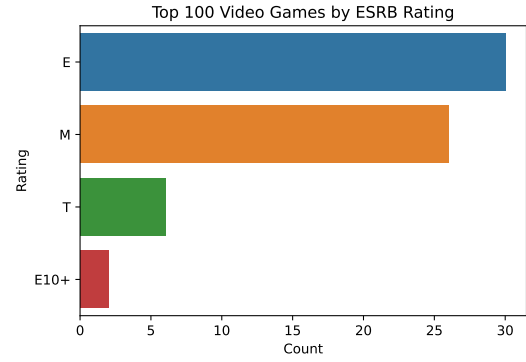


Figure 14: Bar chart that shows the top 100 best global selling video games by ESRB rating.

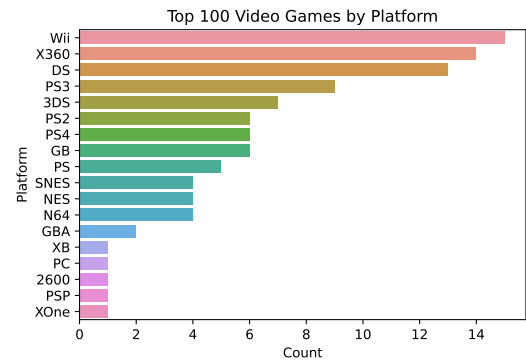


Figure 15: Bar chart that shows the top 100 best global selling video games and the platform it was released for.

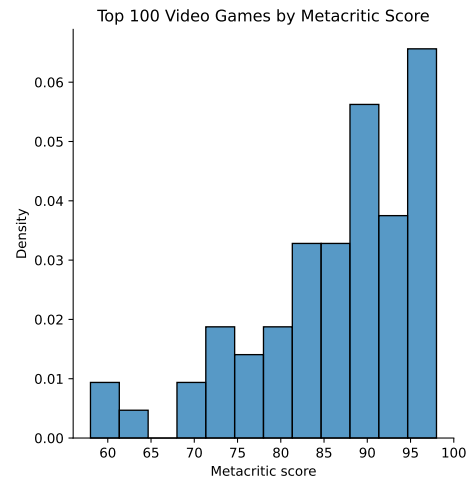


Figure 16: Histogram that shows the Metacritic scores for the top 100 best global selling video games.

highest global sales of about 83 million units sold, which is much higher than the second best selling

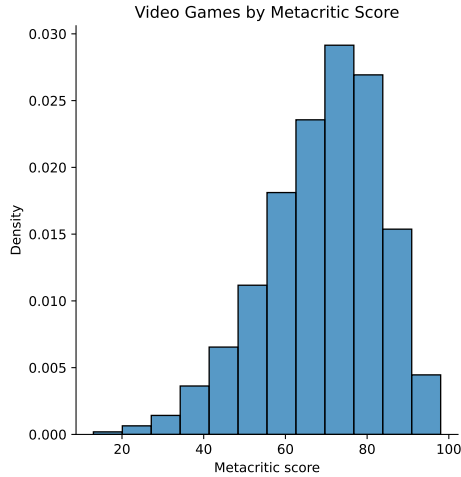


Figure 17: Histogram that shows the Metacritic scores for all video games.

video game, which is *Grand Theft Auto V* with 49.92 million units sold, globally. 90% of these games are published by Nintendo, with *Grand Theft Auto V* being the only game not produced by Nintendo.

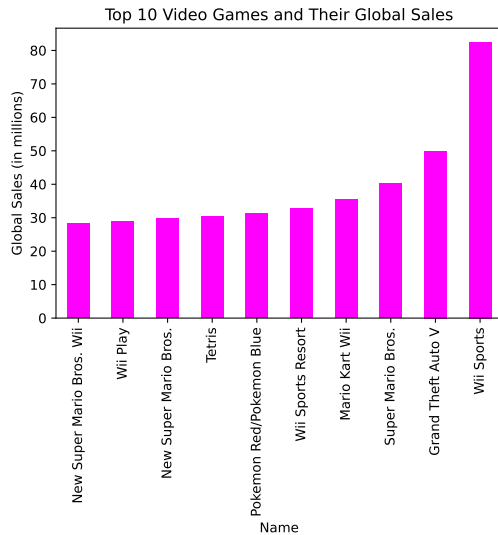


Figure 18: Bar chart that shows the top 10 best global selling video games and their global sales.

### 3.3 Video Game Interest by Region

We will finally take a look at how video game interest is different by region and which region purchases the most video games. Figure 19 shows that between 1980 and 1995, North America and Japan had more video game sales than other regions. Sales for Europe

and “other” started out very low. But after 1995, we see sales for all regions other than Japan start to rise, and then we see a peak in sales in 2008. In 2008, North America has the highest sales, while Europe has the second highest sales. Starting in 2008, video game sales start to decrease. North America and Europe have similar sales in 2015, while Japan and “other” also have similar sales in 2015. Summing up all the sales, Figure 20 shows about half of all video game sales are from North America, a quarter of sales are from Europe, 14% of sales are from Japan, and about 8% of sales are from “other”.

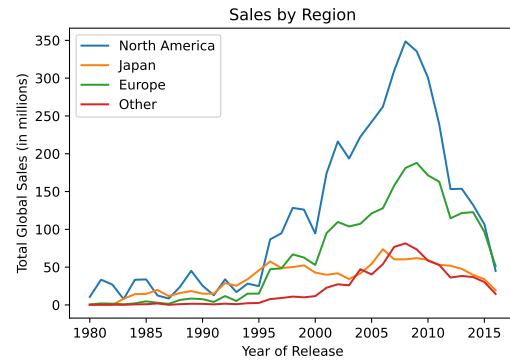


Figure 19: Line graph that shows global sales by region.

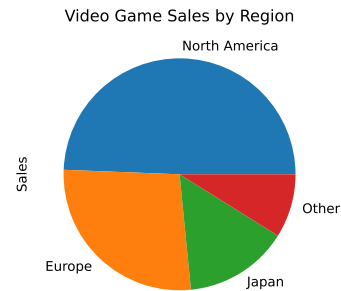


Figure 20: Pie chart for video game sales by region.

We now proceed to examine similarities and differences in video game interest by region. Figure 21 shows the top video game genres by region. In North America, the most popular genres are action, sports, and shooters. In Japan, we see that role-playing games are significantly more popular than the other genres. Europe and “other” share common interests; their most popular genres are action, sports and shooters. All regions seem to enjoy action and sports games. Japan doesn’t enjoy shooter games while shooters are popular everywhere else. Strategy,

puzzle, and adventure games are generally the least popular genres. Figure 22 shows the top 10 best selling video games by region. *Wii Sports* is the best selling video game in North America and Europe, and is the second best selling game in “other”, however, *Wii Sports* isn’t the top 10 best selling game in Japan. Japan seems to favor Nintendo games as 9/10 of their most purchased games is published by Nintendo. Furthermore, 5 of the 10 most purchased games in Japan are Pokémon games. In the “other” region, most of the top 10 purchased games are violent games such as *Grand Theft Auto: San Andreas* and *Call of Duty*. Notice that 3 of the 10 best selling games in Europe are games from the *FIFA* franchise: *FIFA 14*, *FIFA 15*, and *FIFA 16* so we see that Europe favors sports games. Now we finally look at Figure 23 which shows the best selling video game publishers by region. Nintendo is the best selling publisher for North America, Japan, and Europe, while it is the second best selling publisher in “other” regions. In Japan, more than 400 million sold video game units are Nintendo games, so Nintendo dominates the other video game publishers. The best selling publishers seem to be mostly similar in all regions except for Japan. The most popular publishers in Japan are Nintendo, Namco, Konami Digital Entertainment, and Capcom. These companies are also known for their arcade games.

## 4 Conclusion

Our analysis of video games released from 1980 to 2016 reveal that video game interest peaked around 2008 and has decreased from 2008 to 2016. However, video games still remain popular. The most popular genres are action, sports, and shooters. The majority of top 100 best global selling video games of all time have been published by Nintendo. Nintendo still continues to dominate the video game industry globally. Our analysis can help video game companies learn more about what the average consumer is interested in and optimistically recapture video game interest to improve sales.

## References

- [1] Kirubi, R. (2017). *Video Game Sales with Ratings*, Version 2. Retrieved from <https://www.kaggle.com/datasets/rush4ratio/video-game-sales-with-ratings?datasetId=576&sortBy=voteCount>

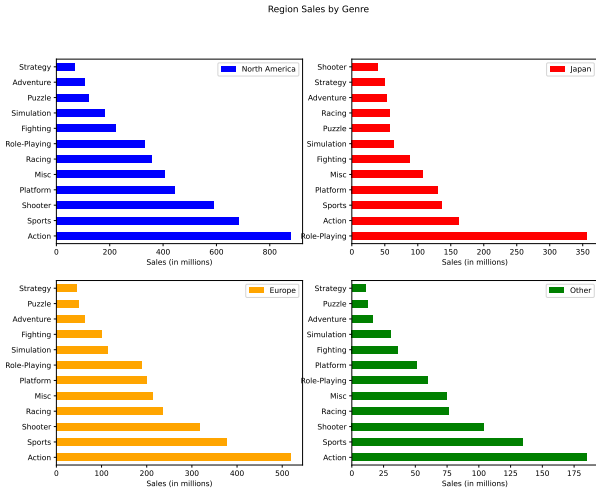


Figure 21: Bar charts for best selling genres by region.

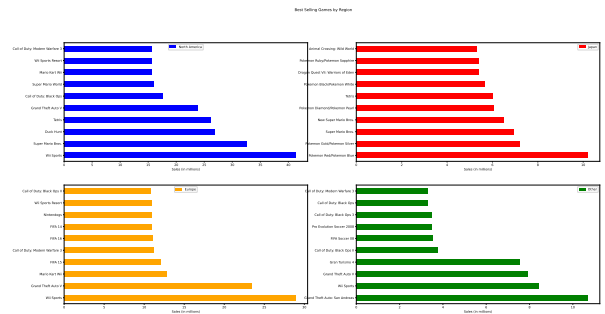


Figure 22: Bar charts for best selling games by region.

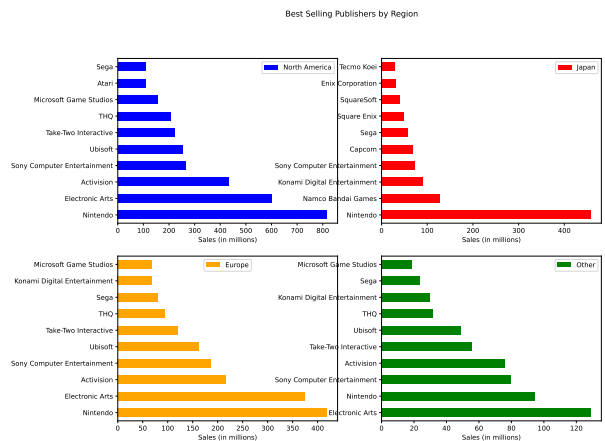


Figure 23: Bar charts for best selling publishers by region.

- [2] Wikipedia. (2022). *History of video game consoles*. Retrieved from [https://en.wikipedia.org/wiki/History\\_of\\_video\\_game\\_consoles](https://en.wikipedia.org/wiki/History_of_video_game_consoles)