

# Course assignment on Video Game Sales Data Analysis

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## 1. Introduction

The video game market is a billion-dollar business that has a large and expanding fan base. This expanding sector has grown in significance both commercially and politically. According to a business report by the Grand View Research [1], in 2022 the global video game market size was estimated at USD 217.06 billion and is expected to grow at a compound annual growth rate (CAGR) of 13.4% from 2023 to 2030. With the advancement of technologies such as more powerful personal computers and other forms of digital devices, video games are now more accessible, portable, and social for the users.

This report analyzes and focuses on video game sales from 2000 to 2009, especially in the North American video game market. Then, we compare the North American video game market data with other markets, especially with the video game market in Japan and the global video game market. We intend to examine the crucial elements that determine a video game's success and how this success varies globally. We will cover the following questions to guide our analysis:

- How do certain game attributes such as genre, platform and publisher affect video games sales worldwide?
- How do video game sales differ from region to region?
- How have video game sales been across the year from 2000 to 2009 and vary from region to region?

In addition, we will make a prediction regarding sales for a particular genre for the years 2010 to 2019. After that we will compare our predicted sales values with the actual historical values. To check how accurate our prediction was.

The task is that I need to answer some business questions that will help game businesses to make decisions. To do so, I need to analyze the data. I need to give some recommendations to decision makers. To fulfill the requirement of this given task, I need to present an in-depth analysis of the game business. For these reasons, I have chosen to write a formal report.

## 2. Sales of video games in different market

In this section, we present an overview of the sales values of video games in different regions globally. First we present the values in numbers in Table 1 and then show them in figures (Figure 2.1 and 2.2).

North American	Europe	Japan	Other regions	Total Global Sales
2399.2	1244.4	510.68	460.63	4617.98

Table 1: Sales values of video games in different regions

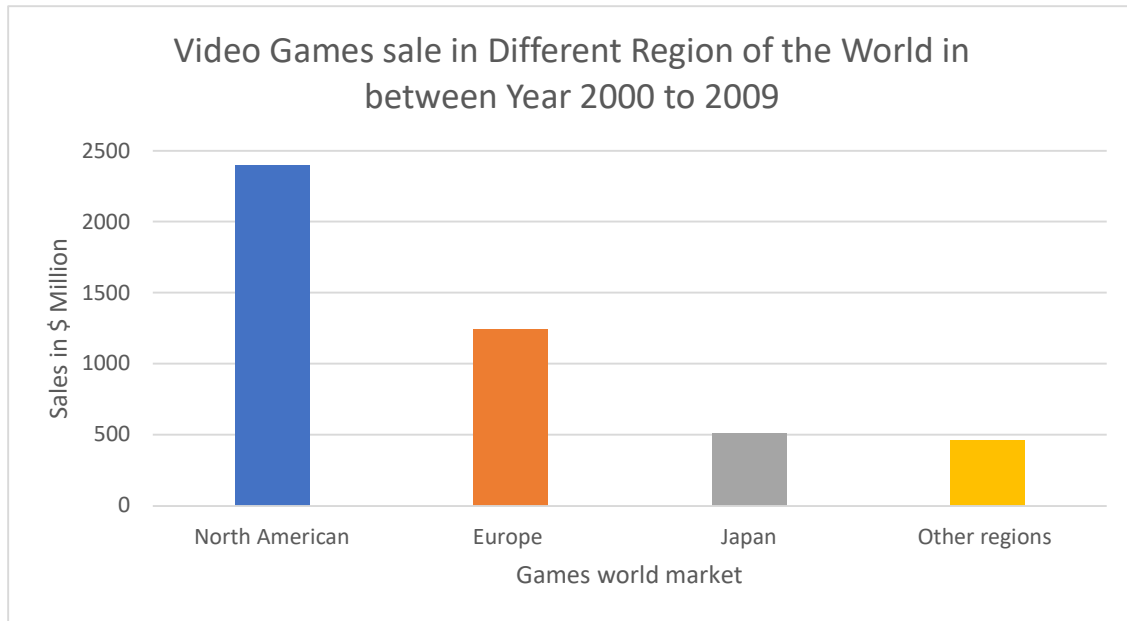


Figure 2.1: Video games sales in different regions of the world in between year 2000 to 2009

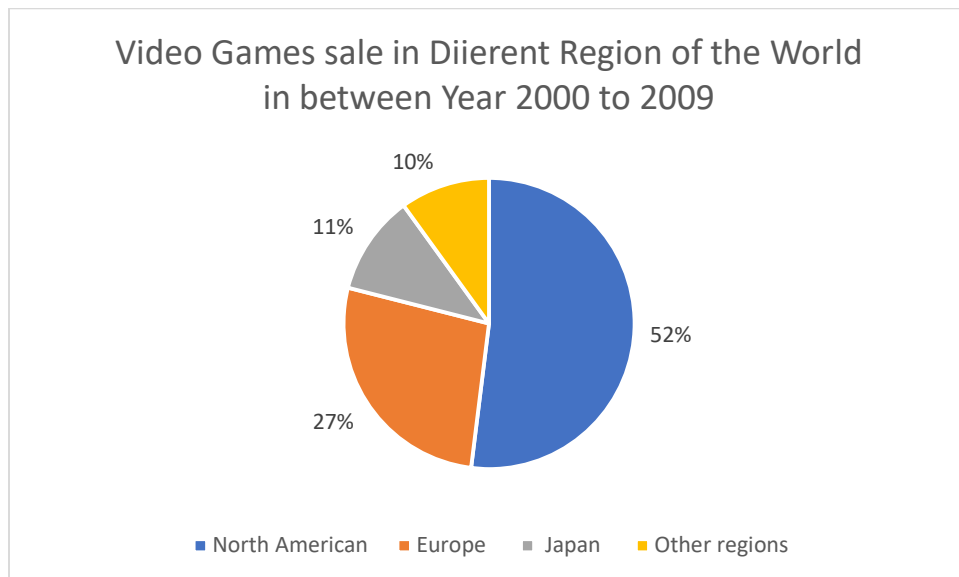


Figure 2.2: Video games sales in different regions of the world in percentage

From Figure 2.2, we can see that over 50% of the video game sales were done in the North American Market between the years 2000 to 2009. The second highest sales happened in the European Market, with 27% of the total video game sales. At the same time, around 11% of the video game sales were done in Japan and 10% in other regions.

Since more than half of the video game sales (52%) happened in the North American Market, this market will significantly influence the overall global market sales performance. Thus, video game makers should focus on keeping this North American Market in hand by meeting consumer demands and expectations and then can focus more on expanding and improving the market strategies in the European Market and then the Japanese and other market regions.

### 3. Different trends in the sales

#### 3.1 Game genres

From the data, we now find out which video game genres were more prevalent in North America in the target period (2000 - 2009) and whether these same genres are profitable in the other markets of the world. Table 2 gives an overview of the video game sales based on each genre.

Genre	North America	Europe	Japan	Other Market	Total Sales
Action	461.63	232.95	60.03	98.46	853.67
Sports	432.58	222.74	60.37	86.84	802.9
Misc	241.47	130.62	61.14	50.56	484.27
Racing	226.2	137.27	21.06	53.85	438.46
Shooter	257.76	122.57	9.24	43.39	433.22
Role-Playing	170.25	80.21	138.17	27.31	415.99
Platform	202.65	101.7	39.46	30.89	374.98
Simulation	135.78	78.31	26.86	22.71	263.77
Fighting	121.72	54.18	30.99	23.42	230.41
Adventure	61.29	30.62	21.67	9.16	122.8
Puzzle	55.05	33.17	20.78	8.6	118.03
Strategy	32.82	20.06	20.91	5.44	79.48

Table 2: Sales of video games based on the game genre.

In the following figures (Figure 3.1, 3.2 and 3.3) we visualize the video game sales with bar charts depending on each region.

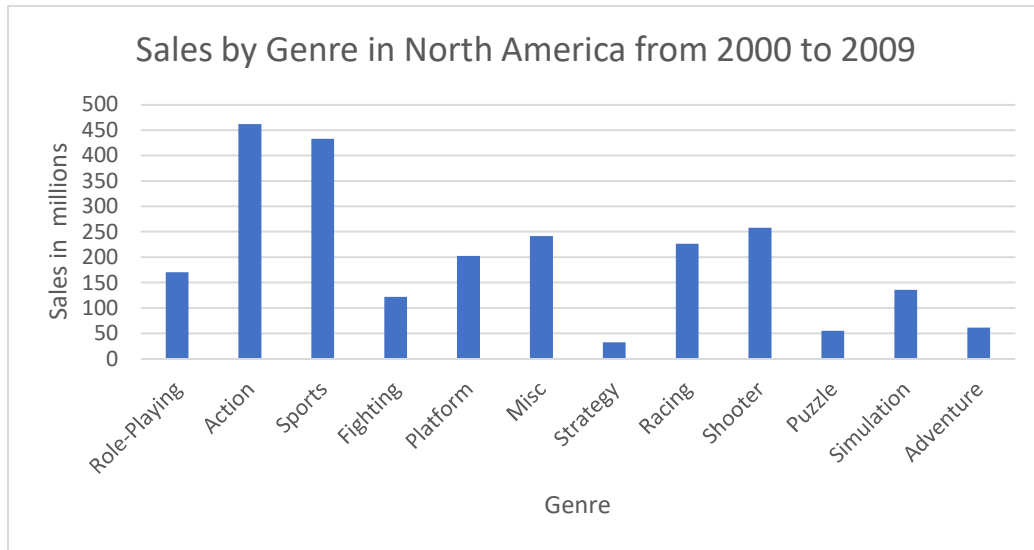


Figure 3.1: Sales of the video games based on the genre in North America

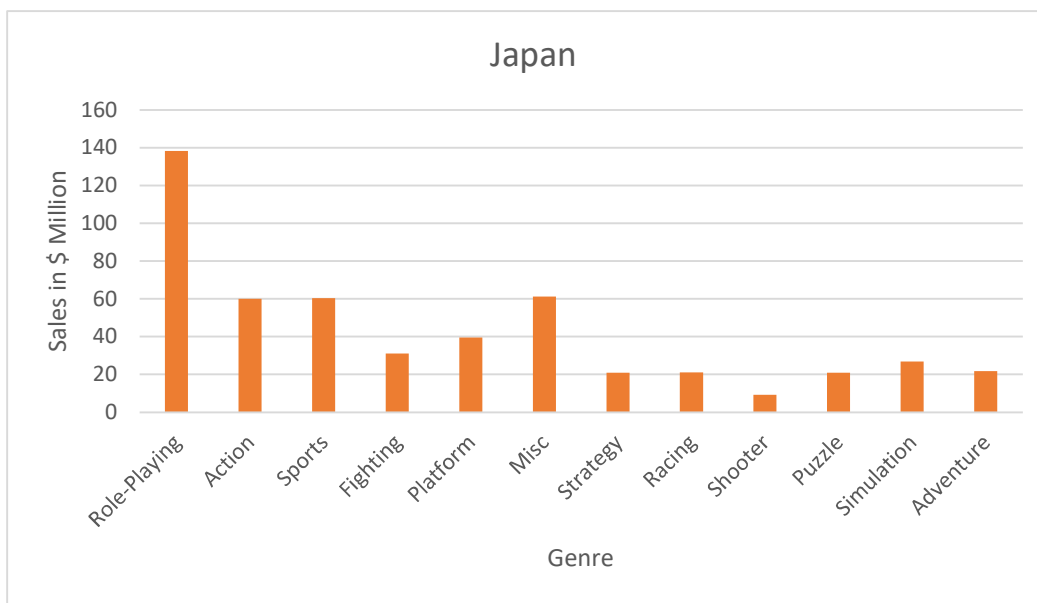


Figure 3.2: Sales of the video games based on the genre in Japan

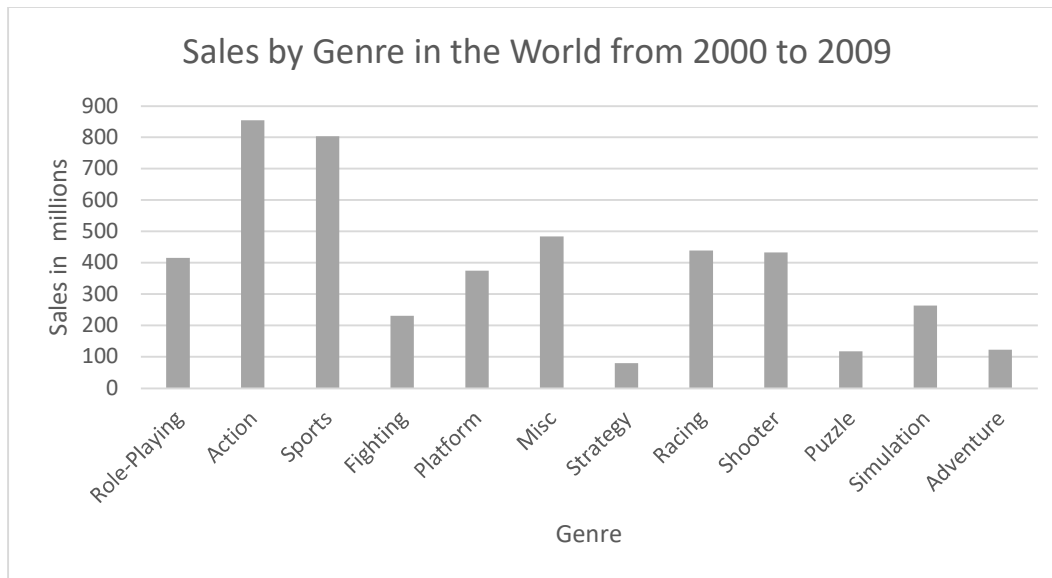


Figure 3.3: Sales of video games based on the genre globally.

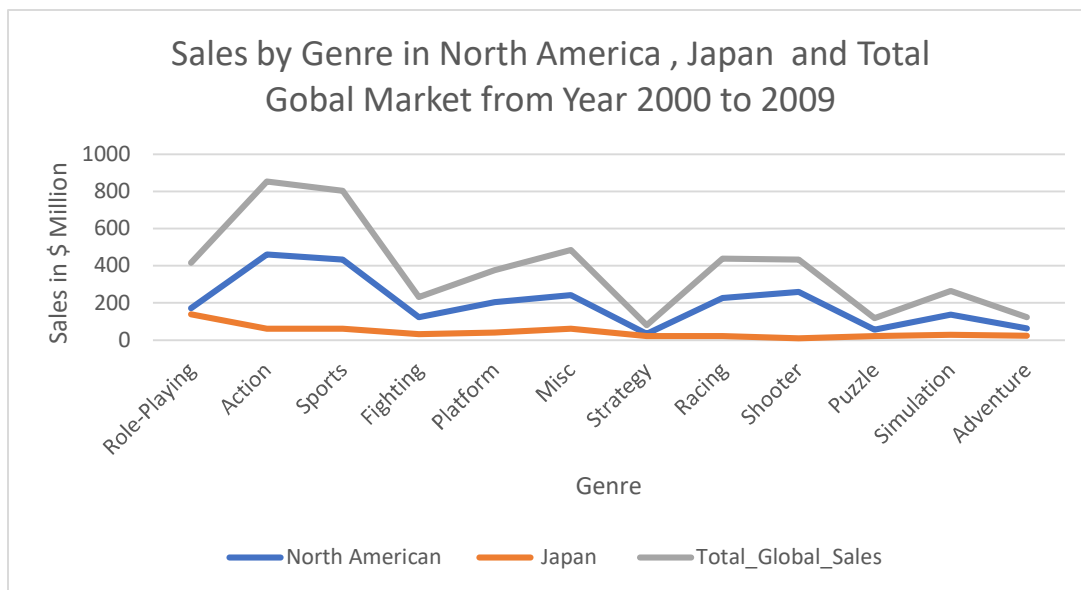


Figure 3.4: Sales by genre in North America, Japan and global Market

Now, when we compare the sale patterns in different regions (as presented in Figure 3.4 and Figure 3.5), we can see that the sale patterns in North America and the global market are quite similar. But not the Market of Japan. To summarize the findings and the comparisons, we can highlight a few points, as mentioned below.

- North American video game sales make up the majority of the Worldwide video game sales.

- Shooter and Racing games are more attractive in the North American Market than in the Japanese market. Japanese gamers are less attracted to Shooter and Racing games than the North American player.
- Action and Sports games are the most preferred in North America, making a total of \$461.63 Million and \$432.58 Million of sales value, respectively.
- Adventure (\$61.29 Million), Puzzle (\$55.05 Million), and Strategy (\$32.82 Million) games are low performing in the North American Market.
- Action and Sports games are the most preferred in the Global, making a total of \$853.67 Million and \$802.9 Million, respectively.
- Strategy games are the lowest preferred in the Global Market, with total sales of \$79.48 Million.

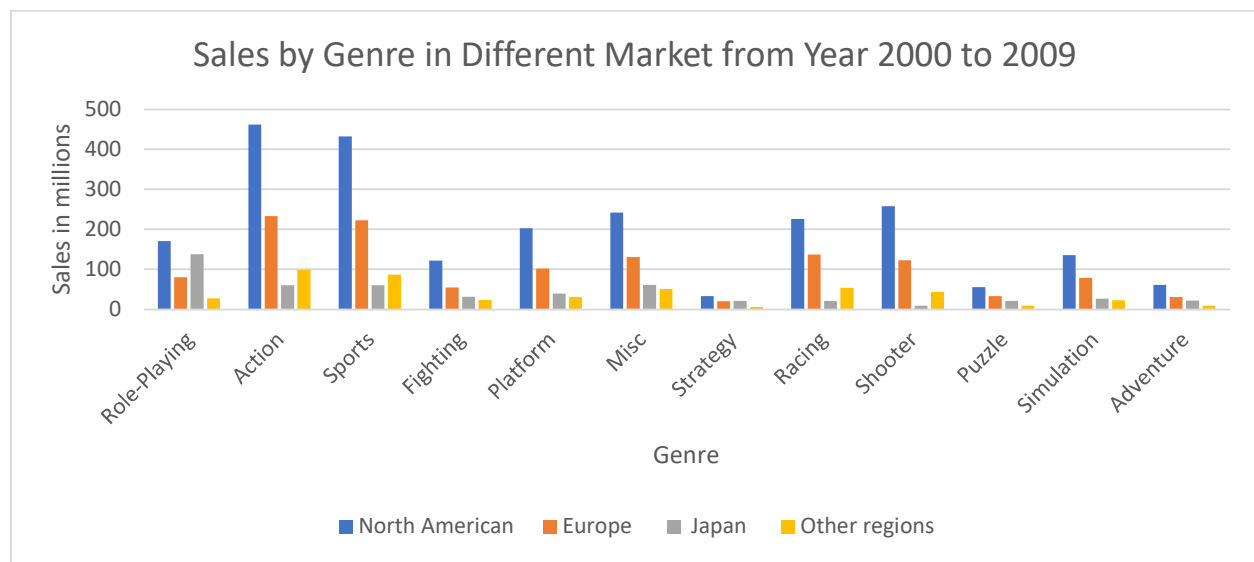


Figure 3.5: Bar chart of the sales by genre in North America, Japan and global Market

From Figure 3.6, we can see that sales of North American video games are most comparable to those of European games. This may indicate that popular video games in North America also tend to be popular in Europe. The game which is successful in North America should be successful in Europe.

However, Japan's trends are different than in North America and Europe. In North America, action games are the most popular games, but in Japan, the most popular games are Role-Playing games. Which is also supported by other analysis [3]. Shooter and racing game is quite popular in North America but not Japan.



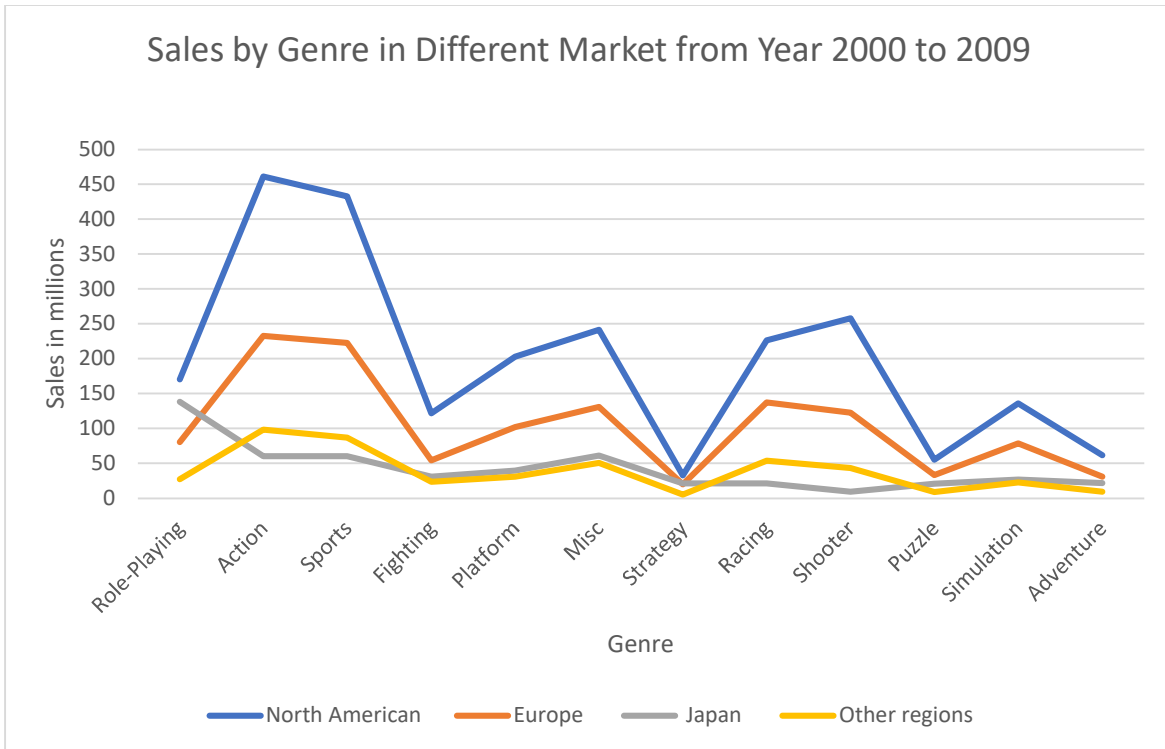


Figure 3.6: Line graph of the sales by genre in different market from year 2000 to 2009

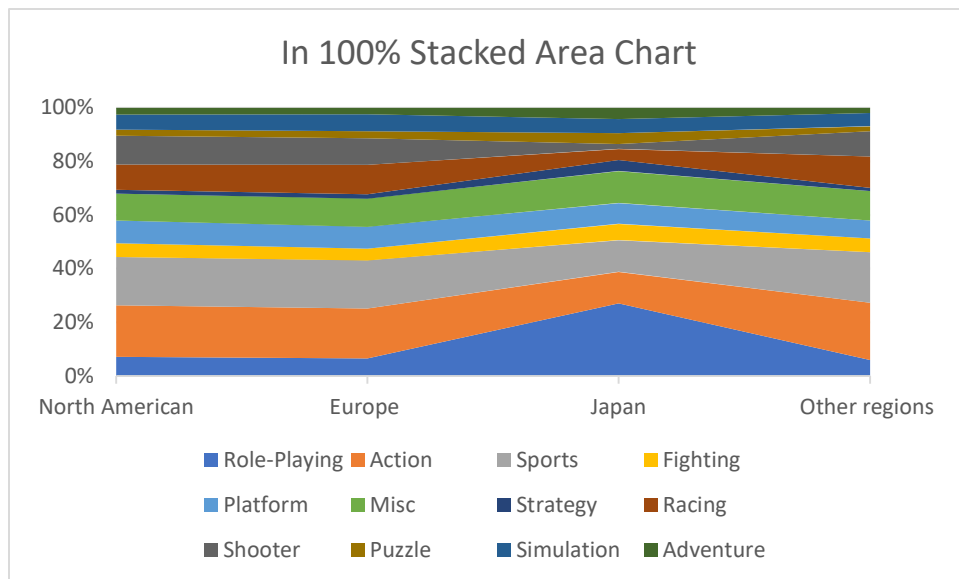


Figure 3.7: Stacked area chart of the sales by Genre in different Market from Year 2000 to 2009

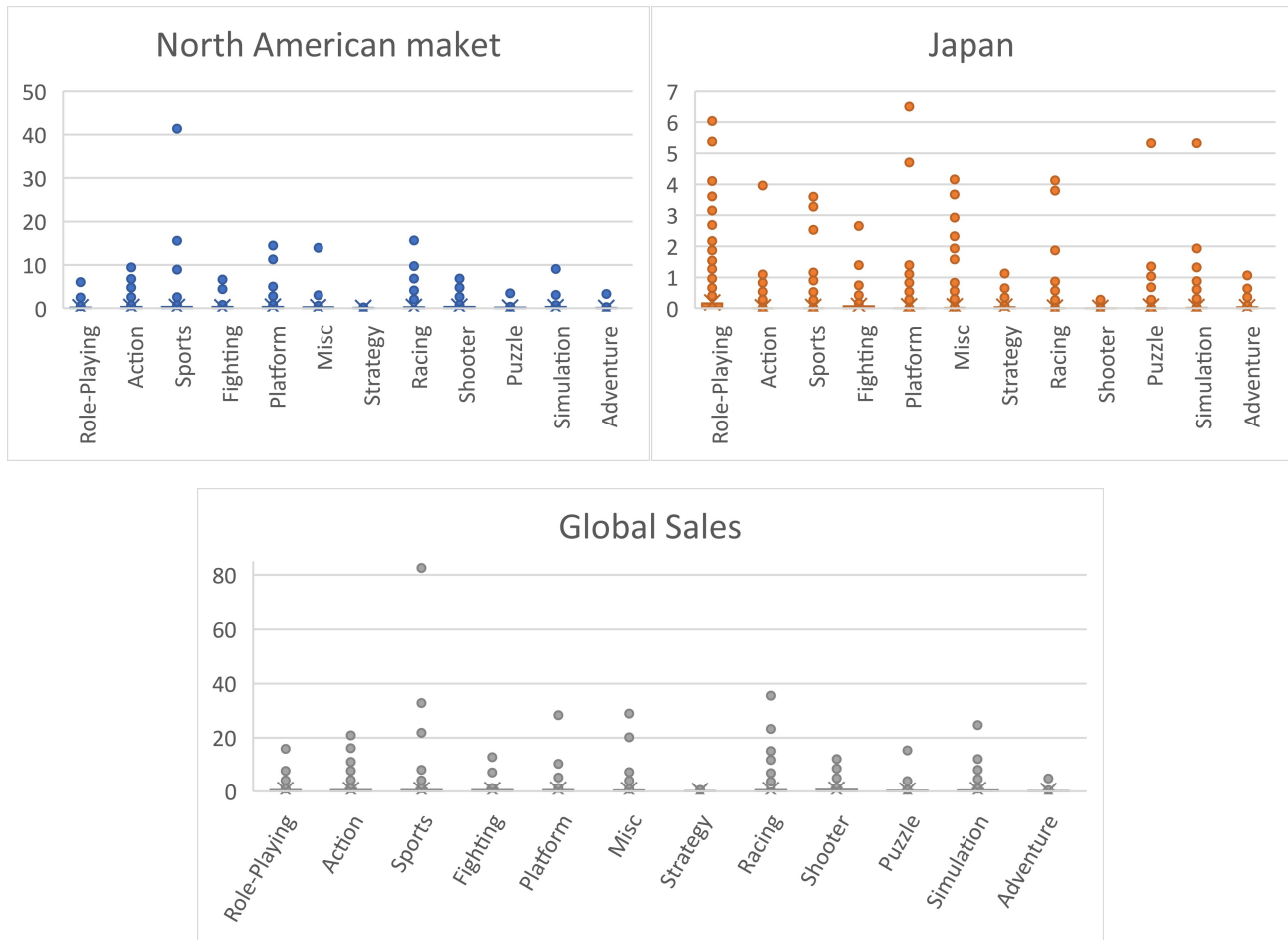


Figure 3.8: Boxplot of the game genre

As we can see from Figure 3.8, every boxplot of the genre has one or more outliers, which means that each genre of video game has at least one successful game, proving that the success of a video game is not only based on the trend of its genre. Comparatively speaking to other video games, a number of sports-themed video games seem to have had tremendous popularity. Visually, the Japanese market has many outliers in all categories of genres compared to North America.

### 3.2 Platform

Table 3 and Figure 3.9 give an overview of the game platforms and the number of releases associated with each platform. Between the year 2000 and 2009, PS2 has released more than 2000 titles. DS has released around 1600 titles. Wii, GBA, and XB have released around 800 titles.

Platform	PS2	DS	Wii	GBA	XB	PSP	X360	GC	PC	PS3	PS	N64	DC	GB	WS
No. of Release	2082	1613	836	811	803	693	552	542	438	417	274	70	31	27	4

Table 3: Different game platforms and respective releases

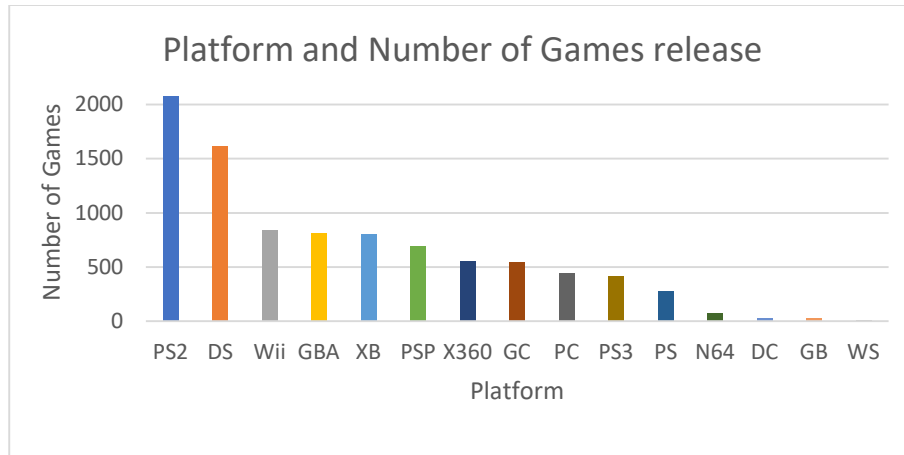


Figure 3.9: Different game platforms and respective game releases

From Figure 3.10 and Table 4, we can see that sales through PS2 is highest in North American and the Global Market but sales through DS is highest in Japan. Even though DS is second in number of releases in game title, it is slightly lesser than Wii platform's sale in the global market.

The lifespan of Nintendo DS is November 21, 2004 - 2013 and of PS2 is March/November of 2000 – 2013 [2]. Due to the long lifespan of these two platforms, it can be assumed that the production of video games using these platforms were also high.

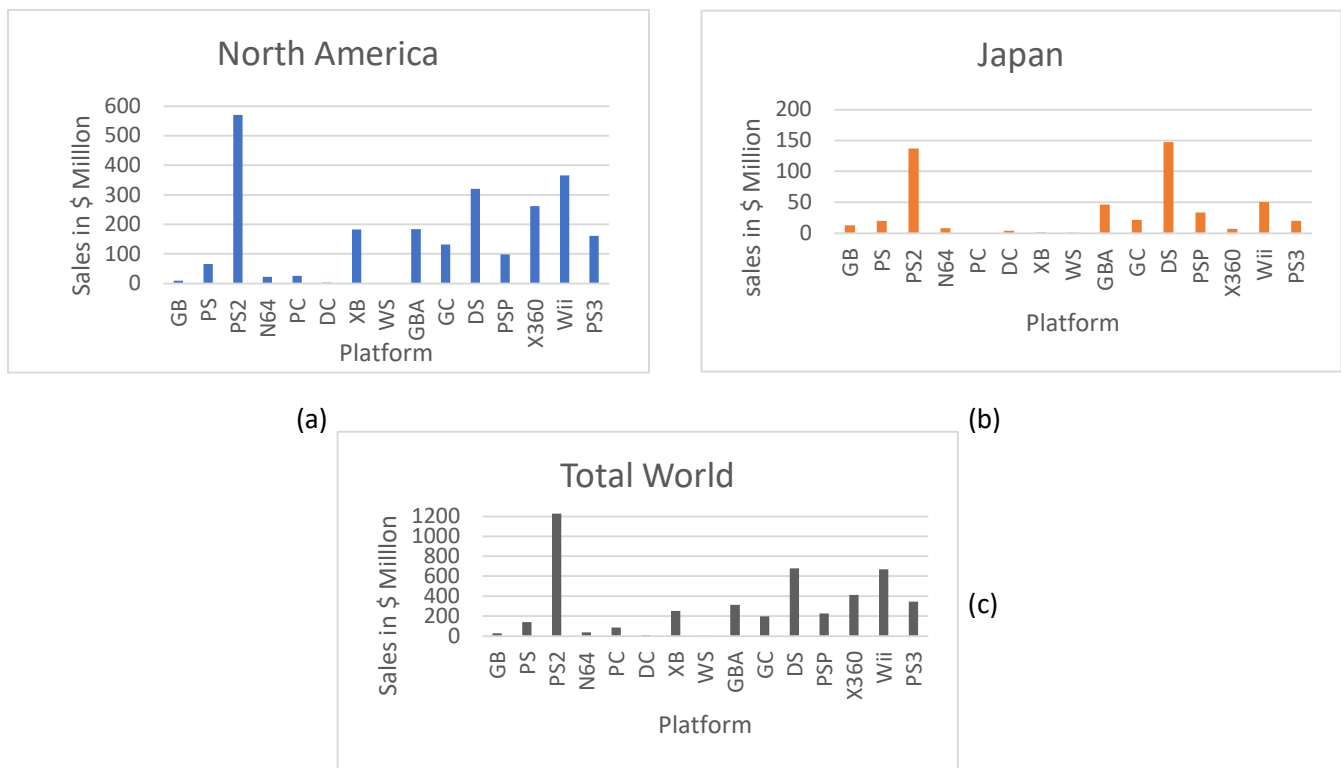


Figure 3.10: Sales on different platform in different regions (a) Sales in North America, (b) Sales in Japan and (c) sales worldwide

Platform	North America	Europe	Japan	Other Region	Total Global Sales
GB	9.12	5.19	13.01	1.68	29
PS	65.71	46.94	20.1	7.95	140.56
PS2	570.6	330.96	136.74	189.17	1227.36
N64	21.88	6.13	8.25	1.04	37.35
PC	24.86	52.52	0.08	6.3	84.28
DC	2.53	0.79	3.96	0.13	7.41
XB	182.06	59.65	1.38	8.48	252.09
WS	0	0	0.96	0	0.96
GBA	184.12	74.59	46.56	7.61	313.56
GC	131.94	38.32	21.34	5.13	197.14
DS	320.65	160.35	147.1	50.91	679.58
PSP	97.62	58.03	33.68	36.15	225.8
X360	261.56	104.91	6.84	37.52	410.89
Wii	365.67	192.41	50.53	59.6	668.54
PS3	160.88	113.61	20.15	48.96	343.46

Table 4: Video game sales in different regions based on game platform (numbers in million)

In summary, we can say that,

- Platform wise sales in North America is very similar to the Global Market sales (Figure 3.11).
- PS2 was the most favorite platform in North American and global market during 2000-2009.
- Sales through DS is highest in Japan.



Figure 3.11: Platform wise sales in North America, Japan and total global market from 2000 to 2009

### 3.3 Publisher

Here we fist summarize the top ten global companies/publishers of video games in different regions and see their sales figures in Table 5 and Figure 3.12.

Top Ten Global Publisher	North America	Europe	Japan	Other region	Total Global Sales
Nintendo	379.55	239.58	196.9	61.95	877.99
Electronic Arts	372.13	188.39	8.9	75.13	644.74
Activision	236.41	102.05	1.91	39.18	379.56
Sony Computer Entertainment	138	95.74	24.56	51.9	310.22
THQ	162.75	73.02	2.57	25.42	263.7
Ubisoft	141.92	73.39	4.4	23.3	243.18
Take-Two Interactive	120.56	56.69	2.91	32.44	212.6
Konami Digital Entertainment	57.15	45.29	42.41	22.08	167.01
Sega	71.78	49.22	21.94	16.16	159.23
Microsoft Game Studios	74.46	31.75	2.06	8.09	116.41

Table 5: Top ten video game developing companies and their sales (numbers in million)



Figure 3.12: Top ten global video game development companies and their sales

Now we see the market shares of these top global video game companies in terms of different regions in Figure 3.13 and 3.14. As north America has the biggest market the sales amount for these companies are also respectively higher in North America than the other regions. So, these top ten world companies are selling highest in North America and after that in the European market. Thus, we can say that their global sales are highly dominated by the North American market and after then by the European Market.

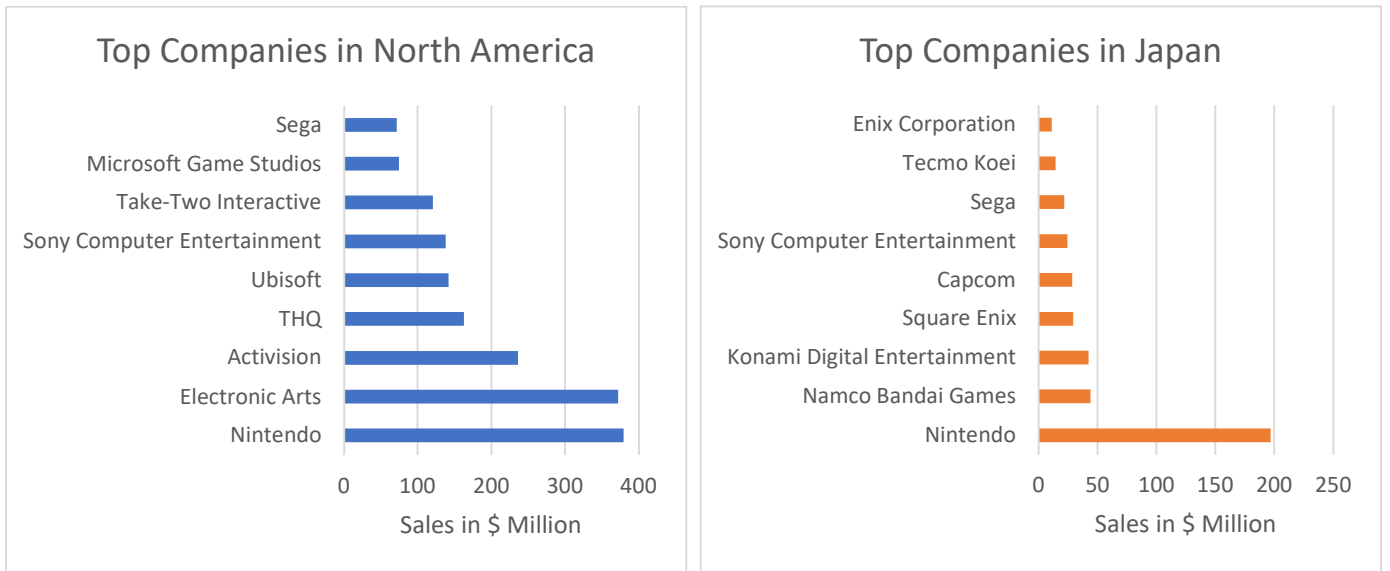


Figure 3.13: Top companies and their sales respectively in North America and Japan

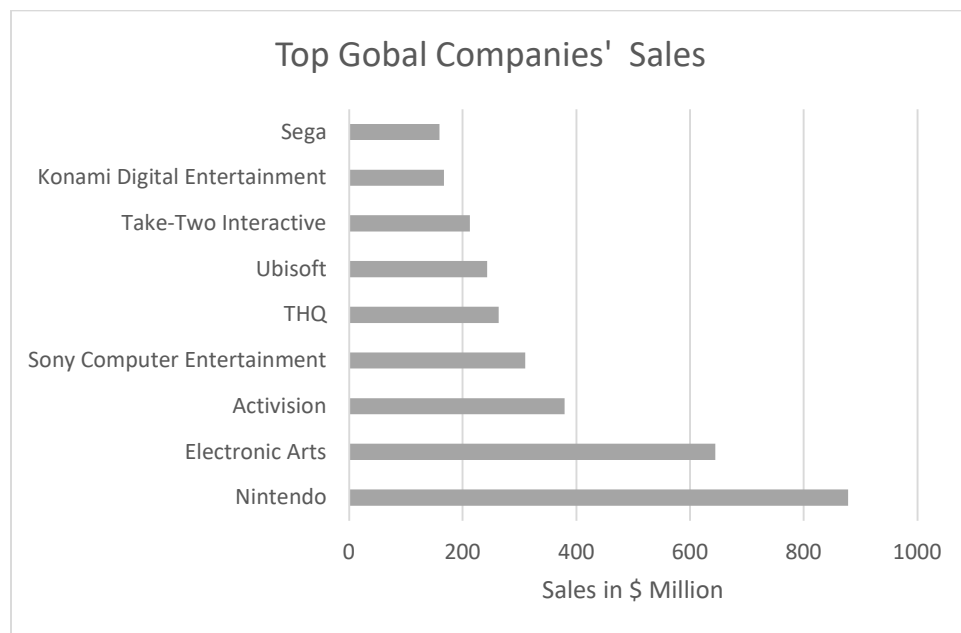


Figure 3.14: Top companies and their sales in the global market

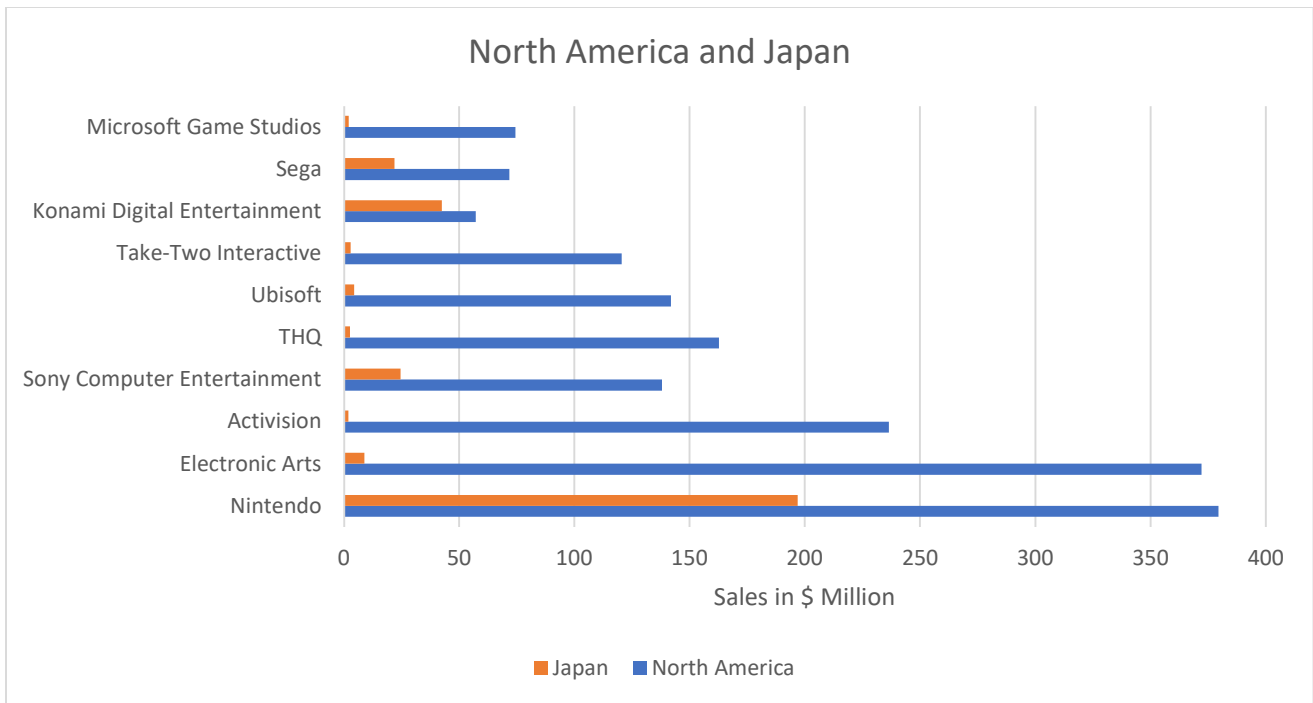


Figure 3.15: Comparison of the sales by the top ten companies between North America and Japan

From Figure 3.15, we can see a comparison of the sales by the top ten companies between North America and Japan. Even though the Japanese market is smaller compared to North America, we can still see that the sales pattern in Japan is different than in North America. However, we can note that in both markets, Nintendo has the highest sales.



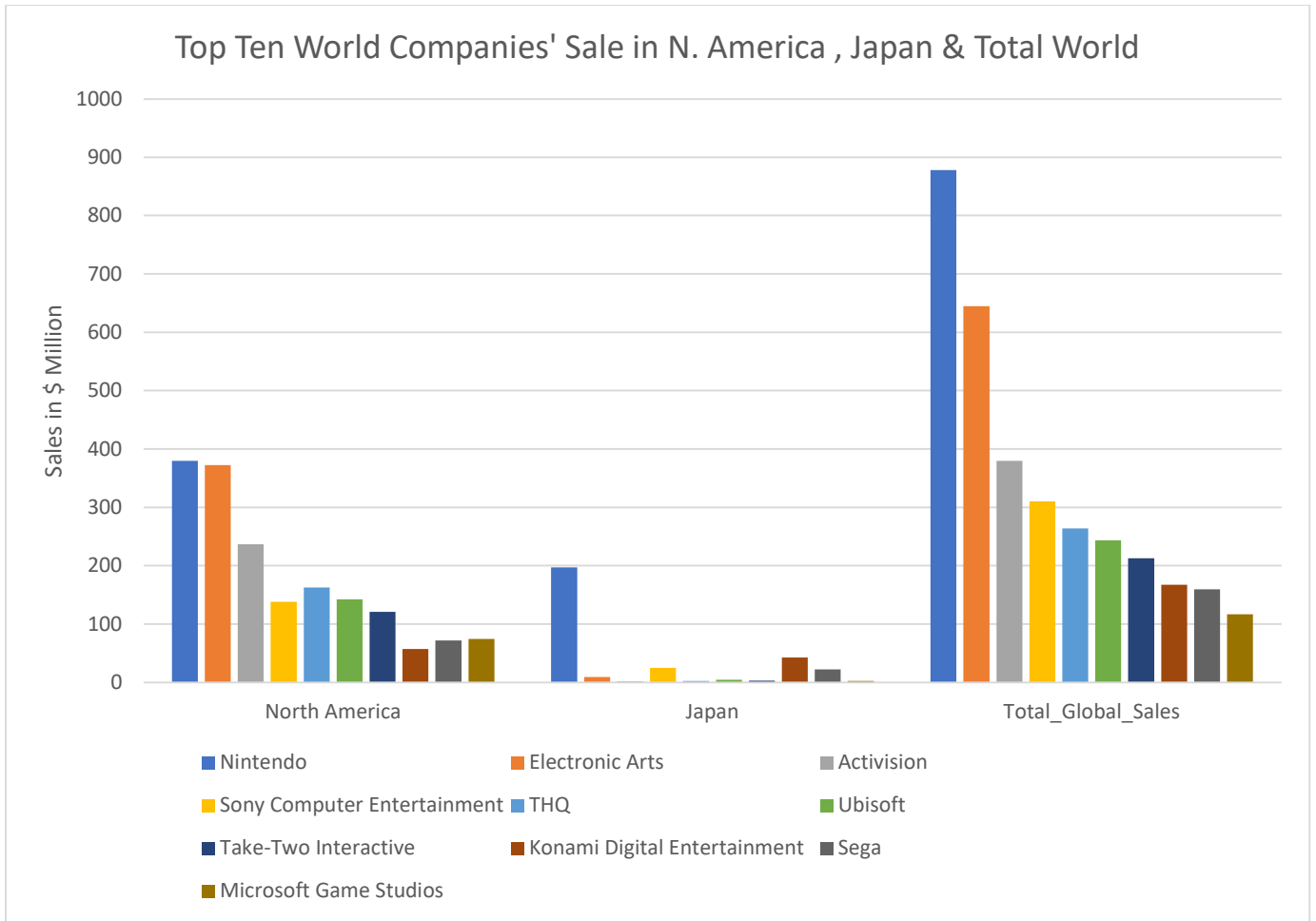


Figure 3.16: Comparison of the sales by the top ten companies in North America, Japan, and globally

As we can see in this figure (Figure 3.16), there is a similarity in terms of sales patterns between the North American market and the total global market. But not in Japan.

In the following Table 6, we present the sales evolution of the games over the years from 2000 to 2009.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Total Global Sales</b>	201.58	331.47	395.51	357.8	419.05	458.31	518.22	605.37	671.79	658.88

Table 6: Sales evolution over time (in million)

As shown in Figure 3.17, video games sales worldwide increased from 2000 to 2009. There is a positive increasing trend in video game sales.

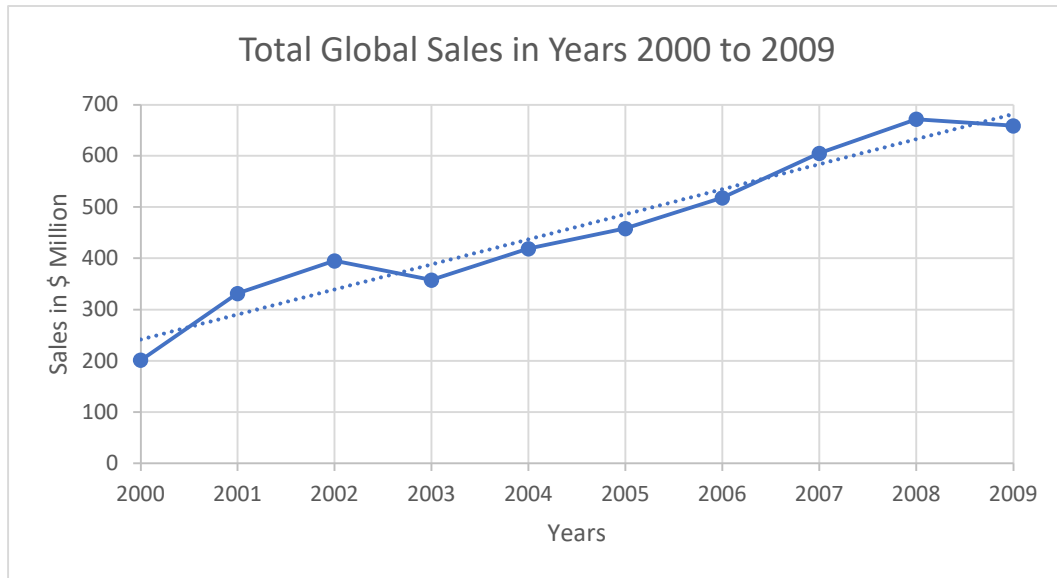


Figure 3.17: Video game global sales over the years

In Table 7 and Figure 3.18, we present the video game sales evolution trend over the years (2000-2009) for specific regions.

Year	North America	Europe	Japan	Other Region
2000	94.5	52.77	42.77	11.62
2001	173.98	94.89	39.86	22.73
2002	216.19	109.75	41.76	27.27
2003	193.61	103.81	34.2	25.92
2004	222.51	107.28	41.65	47.24
2005	242.15	121.11	54.27	40.29
2006	262.13	127.89	73.74	53.95
2007	309.89	157.82	60.29	76.75
2008	348.69	181.14	60.25	81.42
2009	335.55	187.94	61.89	73.44

Table 7: Video game sales in different regions over the years

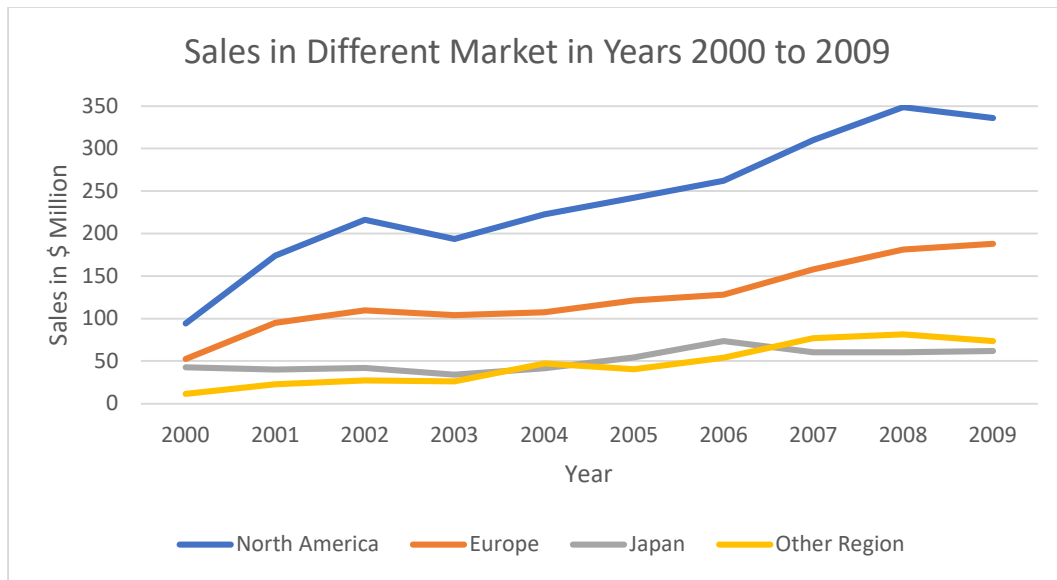


Figure 3.18: Video game sales in different regions over the years

When we compare the sales patterns (Figure 3.18 and 3.19) in these different regions over the years, we see that the increasing rate of video game sales in the North American and European markets is very similar. However, the video game market in Japan was mostly stable, and there was no rapid change in sales.

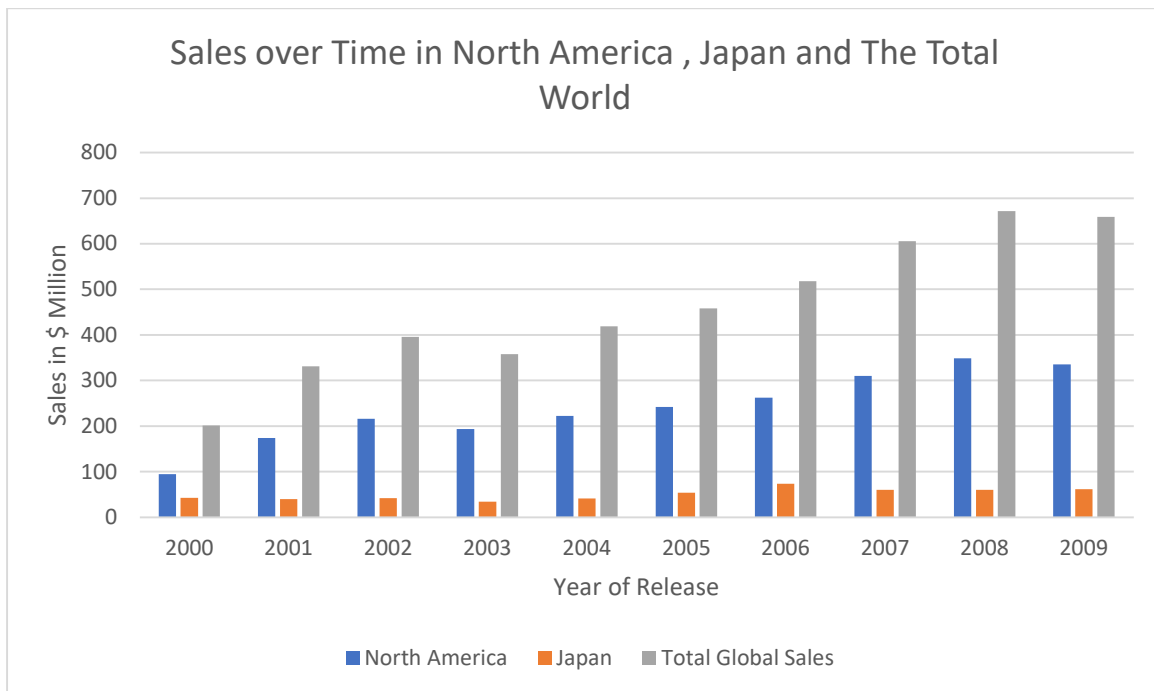


Figure 3.19: A combined view of the sales in three different regions over the years

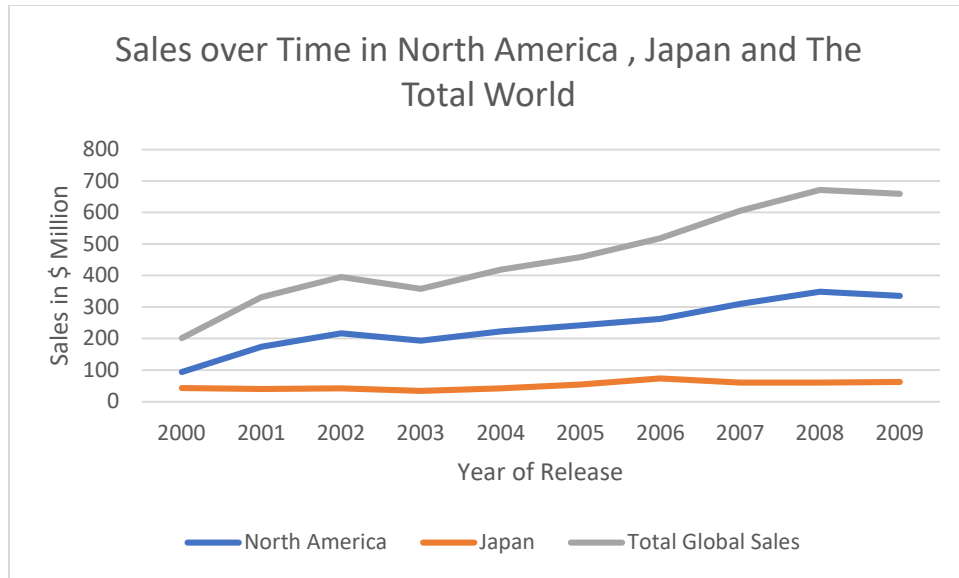


Figure 3.20: A line graph of the sales in three different regions over the years

From the above charts (Figures 3.19 and 3.20), we can see that the North American and Global market increase patterns are very similar from 2000 to 2009. However, that did not happen for the Japanese market in this period. From 2000 to 2004 it was pretty stable, and then there was some increase from 2005 to 2006. Then there was a drop in the year 2007, and after that, it was stable again till 2009.

## 4. Prediction

As we can see in Figure 4.1, the simple linear regression prediction with independent variable year and dependent variable sales did not work for global video game sales. The prediction said there would be an increase in sales. But it is quite the opposite. It seems slightly bad from the year 2010 to 2013. But after that, there was a rapid decline in global video game sales.

The situation is quite similar regarding prediction for North American market sales (Figure 4.2).

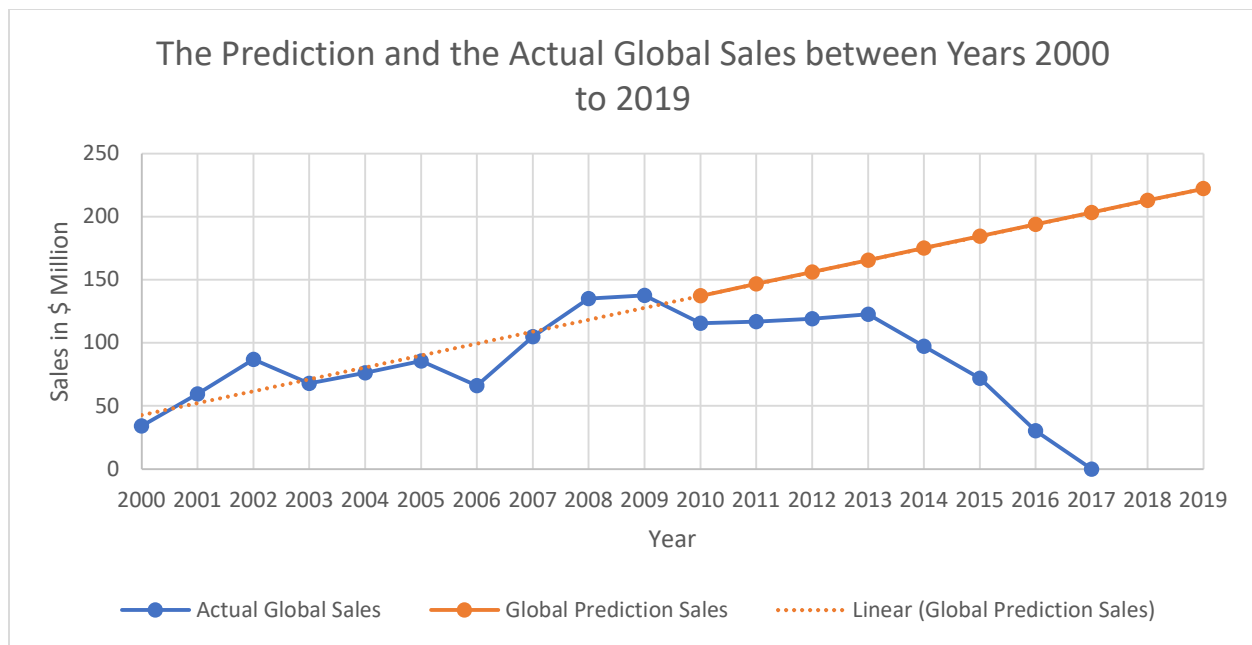


Figure 4.1: The prediction and the actual global sales between years 2000 to 2019

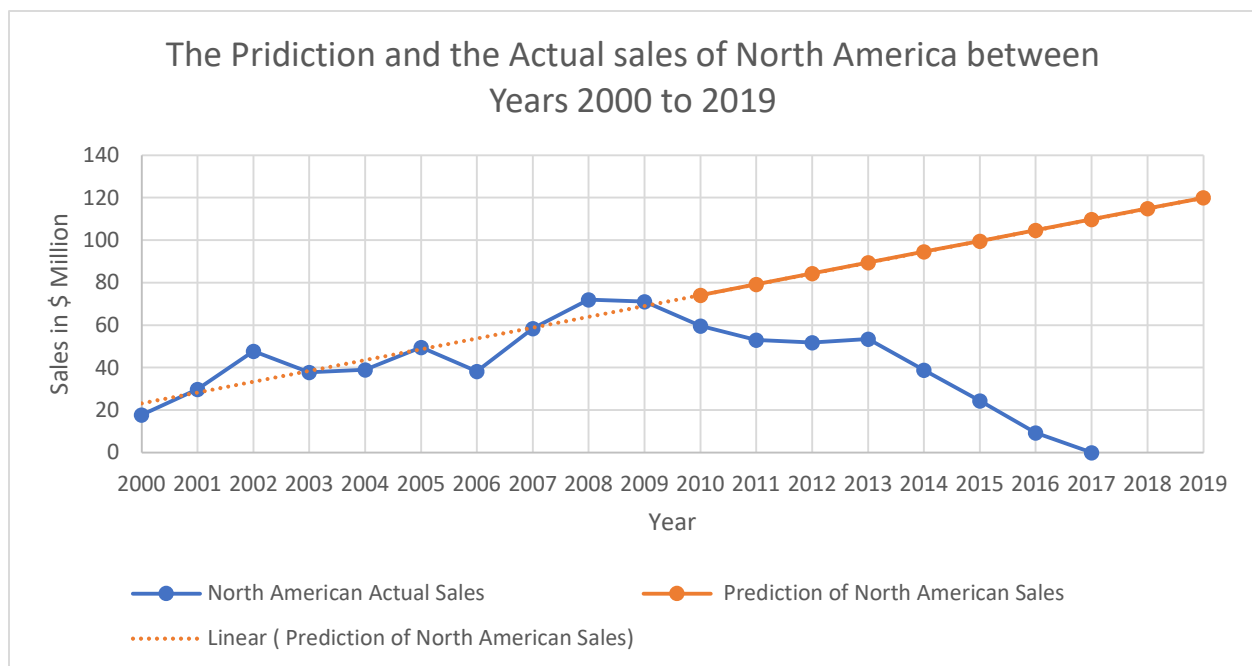


Figure 4.2: The prediction and the actual sales in North America between years 2000 to 2019

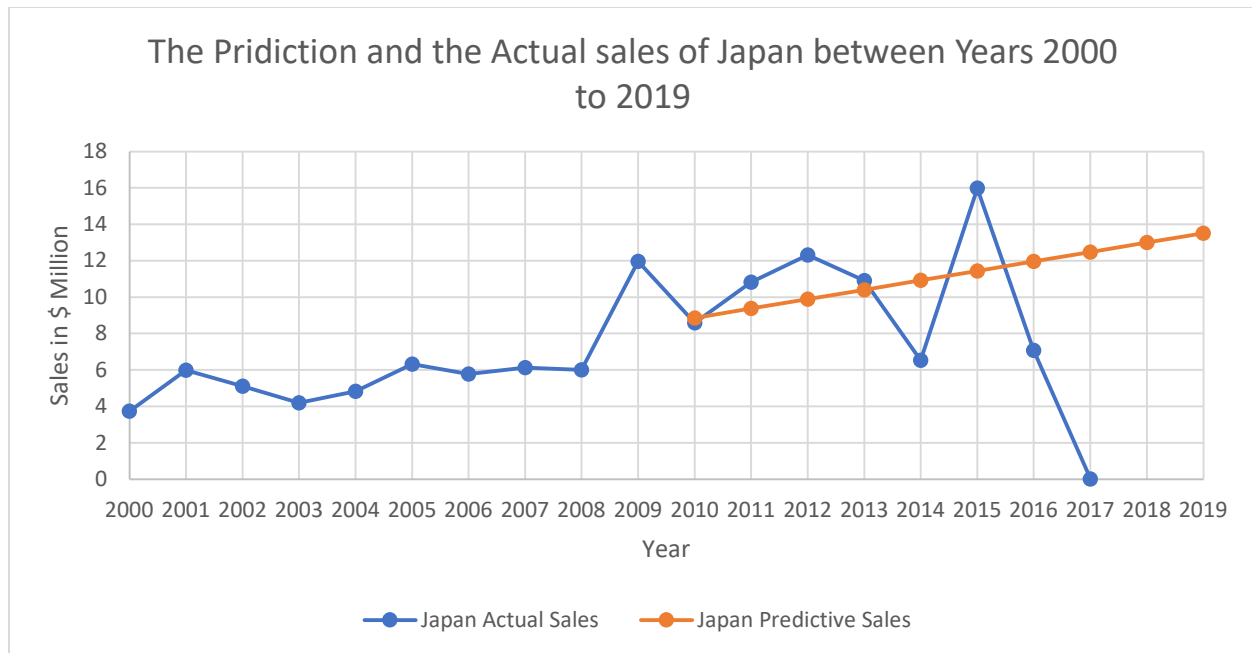


Figure 4.3: The prediction and the actual sales in Japan between years 2000 to 2019

In the Japanese market, the sale was much higher than predicted in the year 2011 and 2012 (as shown in Figure 4.3), as well as around prediction for the years 2010 and 2013. However, there was a huge drop in the year 2014 and a huge high in the year 2015; after that, sales dropped heavily compared to the prediction.

The prediction pattern and its failure in comparison to the actual data for the prediction model of the Global market and North American market is very similar. But that is different for Japan, as we can see visually. Their failure pattern is different.

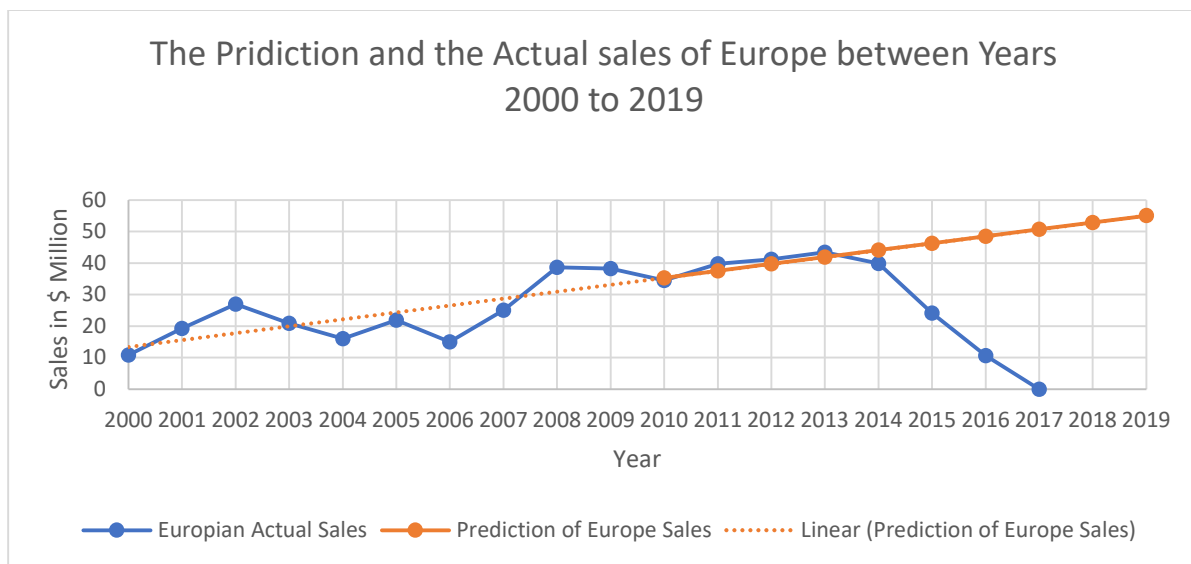


Figure 4.4: The prediction and the actual sales in Europe between years 2000 to 2019

As shown in Figure 4.4, the prediction worked well from the year 2010 to 2013 in the European market, but after 2014, it did not work at all. There was a rapid decline in sales in the European market after that.

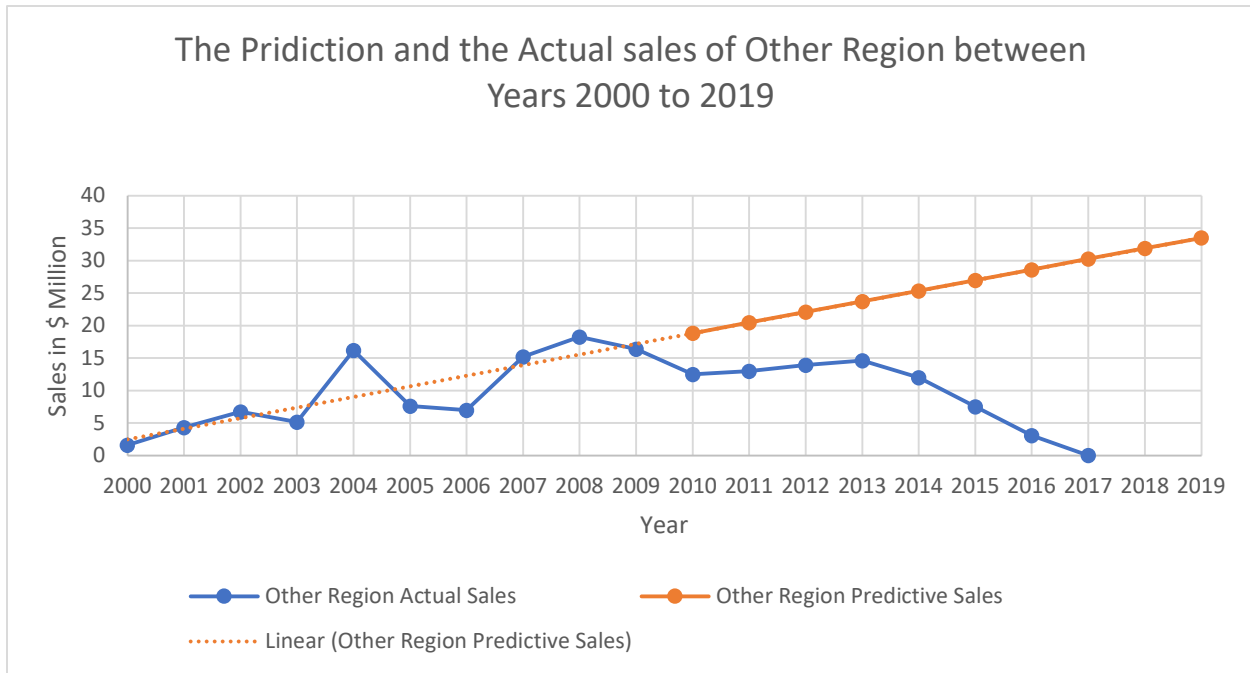


Figure 4.5: The prediction and the actual sales in other regions between years 2000 to 2019

Finally, we can say that the prediction did not work well for the other region (Figure 4.5). From the year 2010 to 2013, the sales difference was from 5 to 8 million dollars. After that, there was a huge drop in sales in other regional markets.

## 5. Conclusion

The success of any business is highly dependent on its better understanding of its market. A business needs to adopt different strategies for different markets, as it can have customers all over the world, and the demand varies from region to region. Since more than half of the video game sales (52%) happened in the North American Market, this market will significantly influence the overall global market sales performance.

This analysis showed that different features affect video game sales. For instance, genre, platform, publisher, and time could affect video game sales differently in different markets. Different genres had different demands and amounts of sales in different markets. Action games had the highest sales in the North American market (European market and other regions), but in Japan, Role-Playing games are the highest in sales. Which is also similar to the findings of Chase Rendall [3].

We saw that Platform-wise sales in North America are very similar to the Global Market sales. PS2 was the most favorite platform in the North American and global market during 2000-2009. Sales through DS are the highest in Japan. Even though the Japanese market is smaller compared to North America, we can still see that the sales pattern in terms of publishers in Japan is different than in North America. However, in both markets, Nintendo has the highest sales. Over time, from 2000 to 2009, the increasing rate of video game sales in the North

American and European markets is very similar. However, the video game market in Japan was mostly stable, and there was no rapid change in sales.

Even though the European market is second highest in sales, it is very similar to the North American market in terms of genre and year-wise sales. So, the strategy for North America game sales for genre and time will be favorable for the European market. However, they should not apply the same strategy for the Japanese market in terms of genre and sales over time. On the contrary, the North American strategy will be very similar to the Global market in terms of genre and sales over time. Because the North American market and the European market form 77% of the Global market.

In this analysis, we have had some predictions for different markets. The prediction indicated that there would be an increase in sales. But in reality, it was quite the opposite. The video game sales slightly declined from the year 2010 to 2013. But after that, there was a rapid decline in global video game sales. Finally, we should keep in mind that external factors may also impact the entire market. External factors may impact customer demand and preference. So, during the market analysis we should consider this as well.

## References

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