Analysis of Trends in Physical Videogame Sales: 1980 - 2012

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Seeking Data Analyst Position

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Project Background

- The goal of this project is to showcase proficiency in full-stack data analysis, encompassing data cleaning, exploratory data analysis (EDA), data augmentation, and data storytelling
- This project explores data analysis and visualization using various methods and tools, including:
  - **Jupyter Notebook and Lab:** Jupyter Notebook and Lab: Repository/Notebook creation and Python environment
  - **Pandas, SQL:** Data Cleaning, preparation, and analysis
  - **Excel, SQL:** Exploratory Data Analysis
  - **Tableau, Excel:** Data visualizations
  - **ChatGPT:** Exploration of generative AI in data analysis
- Each method has its own strengths and weaknesses, especially in use for raw data analysis, ability to provide polished visualizations and in terms of time invested to produce
- Demonstration of my critical thinking skills and ability to provide quality insights
- This is a sample project of a comparison of various analytical methods. I am happy to work with you/your team to produce custom reports suitable for stakeholder presentation

Content

This presentation provides a comprehensive analysis of the videogame industry's impact and revenue trends from a contemporary and historical perspective.

Slides 6-9 delve into historical physical sales revenue from 1980 to 2012, examining key trends and milestones that shaped the industry's growth.

Slides 11-14 focus on the peak revenue of 2008, providing an analysis of the factors that contributed to the height of the market.

Slides 15-17 analyze the revenue generated during the introduction of online marketplaces in 2010, exploring the trends of the time and how digital distribution influenced the industry.

Slides 19-20 offer an overview of the impact of the videogame industry on the job market as of 2023

Dataset Information:

- Number of games represented in this dataset: 10,347
- Total physical sales revenue: $7,868,620,000
- Average revenue per game: $546,000
- Each visualization that is labeled accordingly (e.g., Query 1), was created using an aggregated dataset exported from this project's Notebook file. The related query is indicated by the corresponding label.

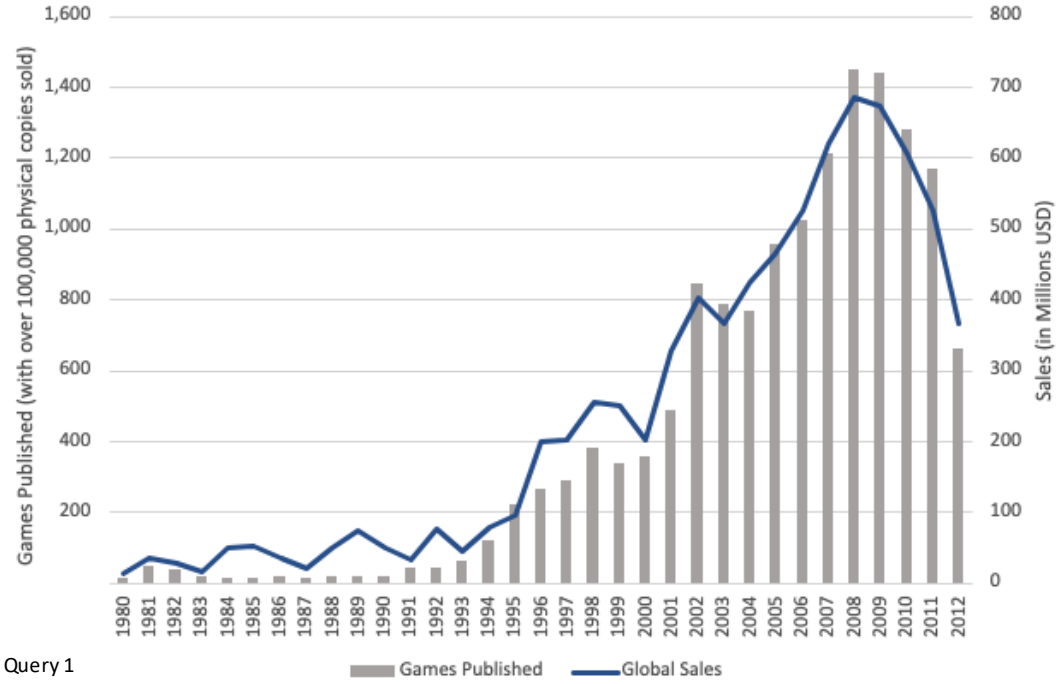
Key Findings

- The sale of physical video games rose at a rate of 14.8% on average every year from the start of the data in 1980 ($14.4 million) to the peak in 2008 ($686.7 million)
- After the peak in 2008 physical game sales rapidly dropped from $686.7 million in 2008 to $366.5 million in 2012, an average of -14.5% and $80 million per year
- Revenue was greatly influenced by the modernization of gaming hardware
  - While the market itself was generally stable, specific platforms and publishers experience high volatility in income based on the short-term nature of video game releases driving sales

Created using: Tableau
Sales adjusted for inflation

Analysis of Historical Physical Sales Revenue (1980-2012)

Number of Games Published vs Global Sales Per Year

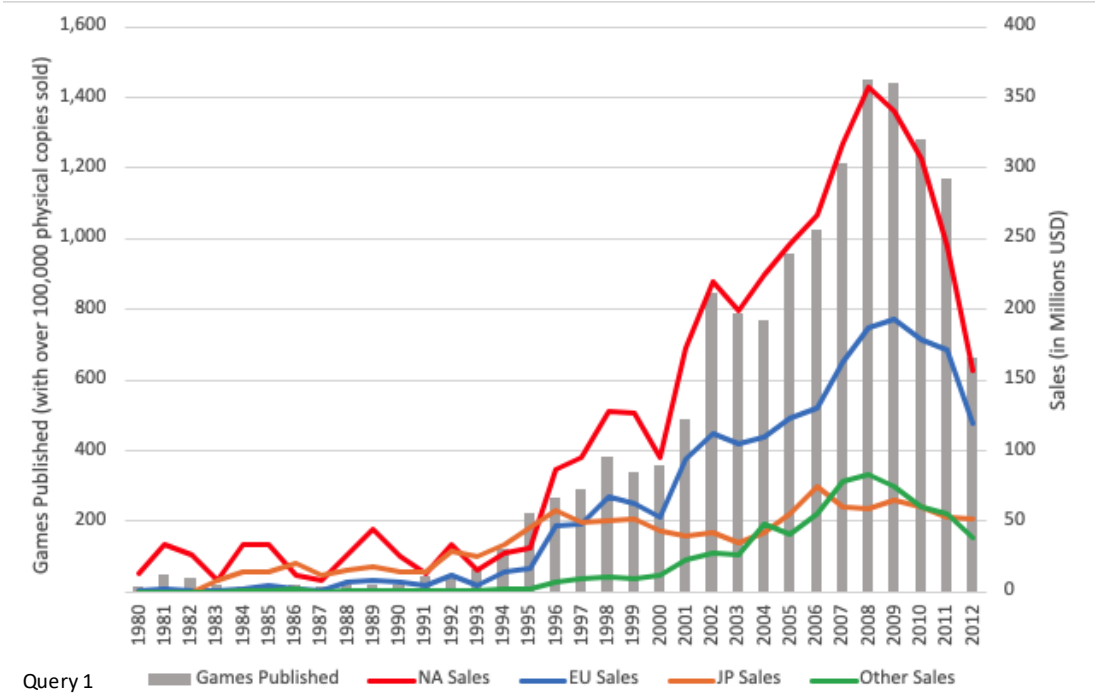


Query 1

- Between 1980 and 2012, physical videogames sales made a total of $78.6 billion in revenue
- Global sales rose from $14.4 million in 1980 and grew to a peak of $686.7 million in 2008
  - Global sales then dropped significantly (47%) to $366.5 million by 2012
  - This decrease is likely related to the economic crisis of 2008 affecting discretionary spending, as well as the proliferation of online game marketplaces concurrently

Created using: Excel
Sales adjusted for inflation

Number of Games Published vs Regional Sales Per Year

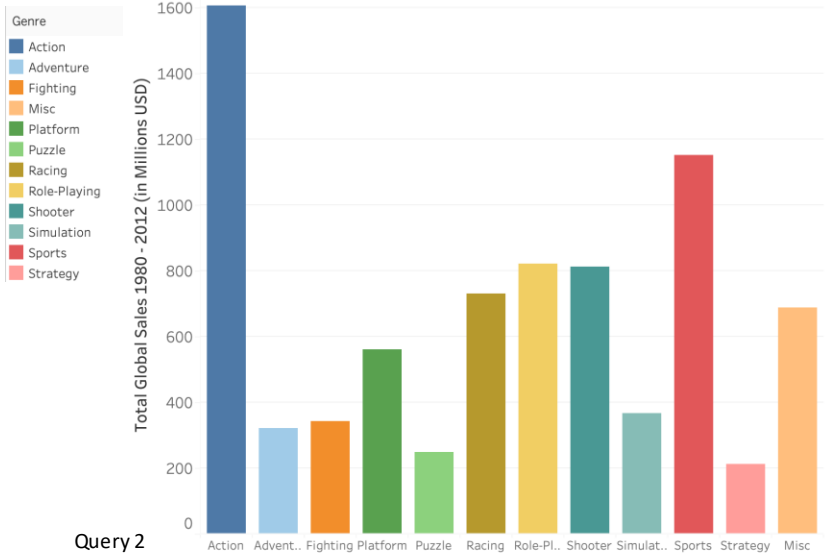


Query 1

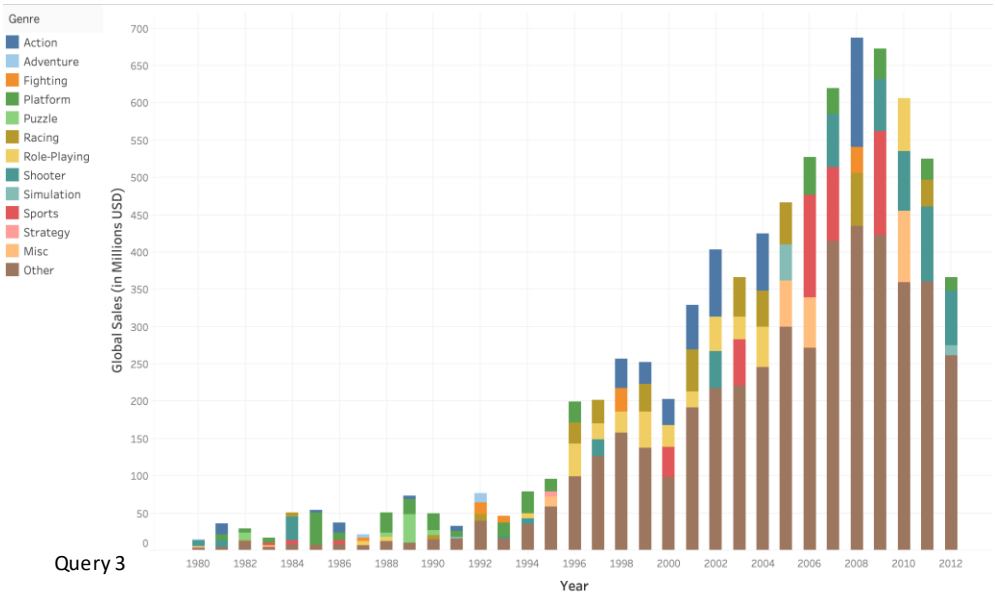
- For all regions, excluding Japan, sales experience a drop after peaking in 2008
- Revenue in Japan was less volatile, with the peak revenue occurring in 2006
  - This is due to a material difference between regions regarding economic status and adoption rate of online marketplaces

Created using: Excel
Sales adjusted for inflation

Analysis of Historical Physical Sales Revenue by Genre



Query 2

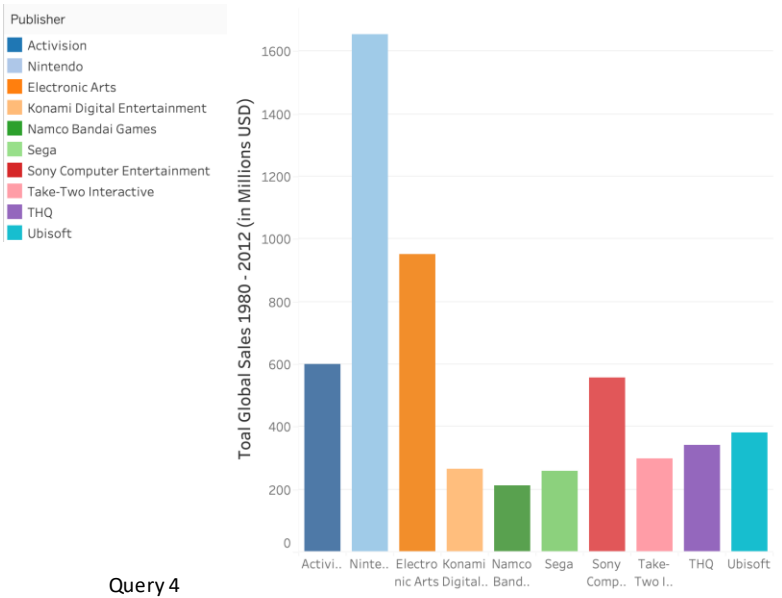


Query 3

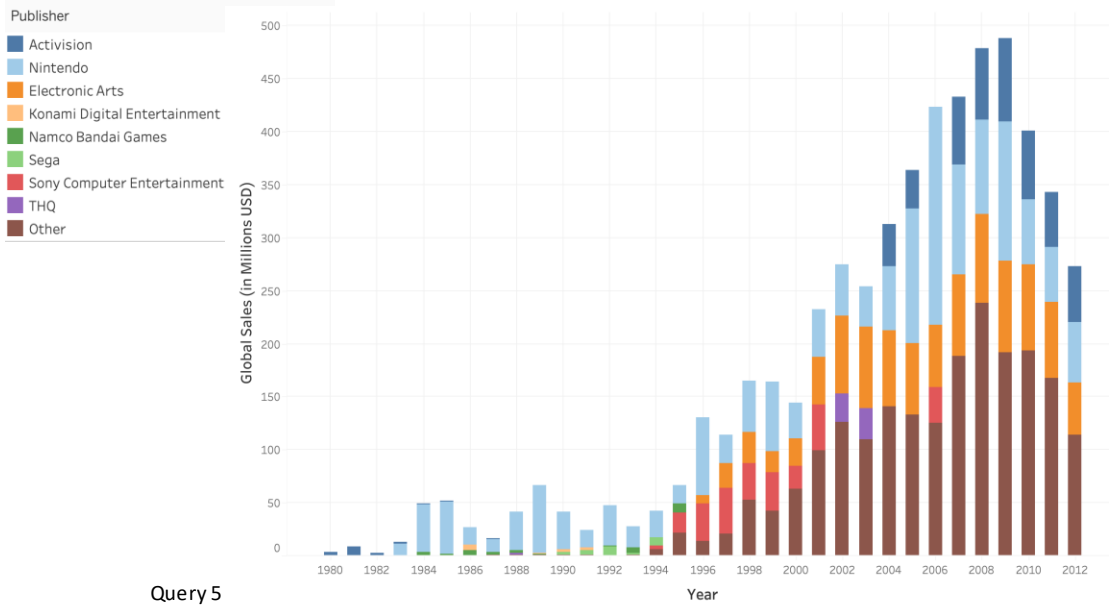
As the gaming industry became more profitable in the 1980s, there was an interest in many different genres. The 1990s showed a shift in sales to Platform and Puzzle games, with the release of standout titles such as Super Mario 64 and Sonic the Hedgehog. The early 2000s brought an increase in sales for Action and Sports games, while the 2010s marked a rise in popularity of Shooter and Role-Playing games.

Created using: Tableau
Sales adjusted for inflation
"Other" field calculated using SQL to find the top ten genres overall, then finding the top three for each year and finally labeling the remaining genres as "Other".

Analysis of Historical Physical Sales by Publisher



Query 4



Query 5

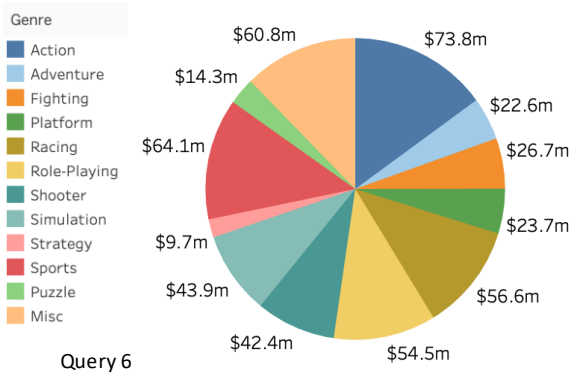
In 1980, Activision was the first publisher to reach over 100,000 physical copies sold. Nintendo games gained popularity in 1983, remaining in the top three publishers annually for the remainder of the timeline. Electronic Arts ascended to the top ranks alongside Nintendo in 1996. Despite the evolving marketplace and the emergence of other popular publishers, Nintendo, Electronic Arts, and Activision remained the dominant forces in the gaming industry from 2006 to 2012.

Created using: Tableau
Sales adjusted for inflation
"Other" field calculated using SQL to find the top eight publishers overall, then finding the top three for each year and finally labeling the remaining publishers as "Other".

Analysis of Peak Market Revenue (2008)

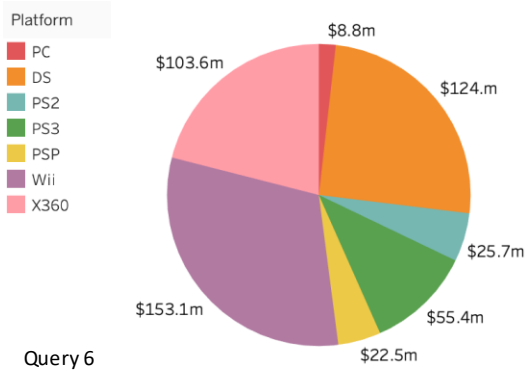
Analysis of Peak Market Revenue (2008)

Peak Market Value by Genre



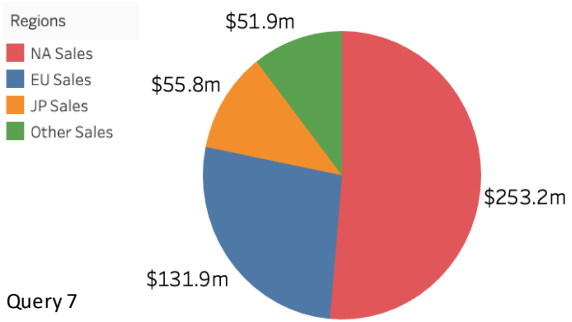
Query 6

Peak Market Value by Platform



Query 6

Peak Market Value by Region



Query 7

- Four genres constitute almost exactly 50% of the market:
  - Action (15%)
  - Sports (13%)
  - Racing (11%)
  - Role-Playing (11%)
  - The remaining 8 genres represent the other 50%
- The Nintendo Wii (25%) and Nintendo DS (31%) platform take up 56% of the market, with the Xbox 360 close behind at 21% of the market
- North American sales constitute over 50% of worldwide videogame sales at the peak in 2008

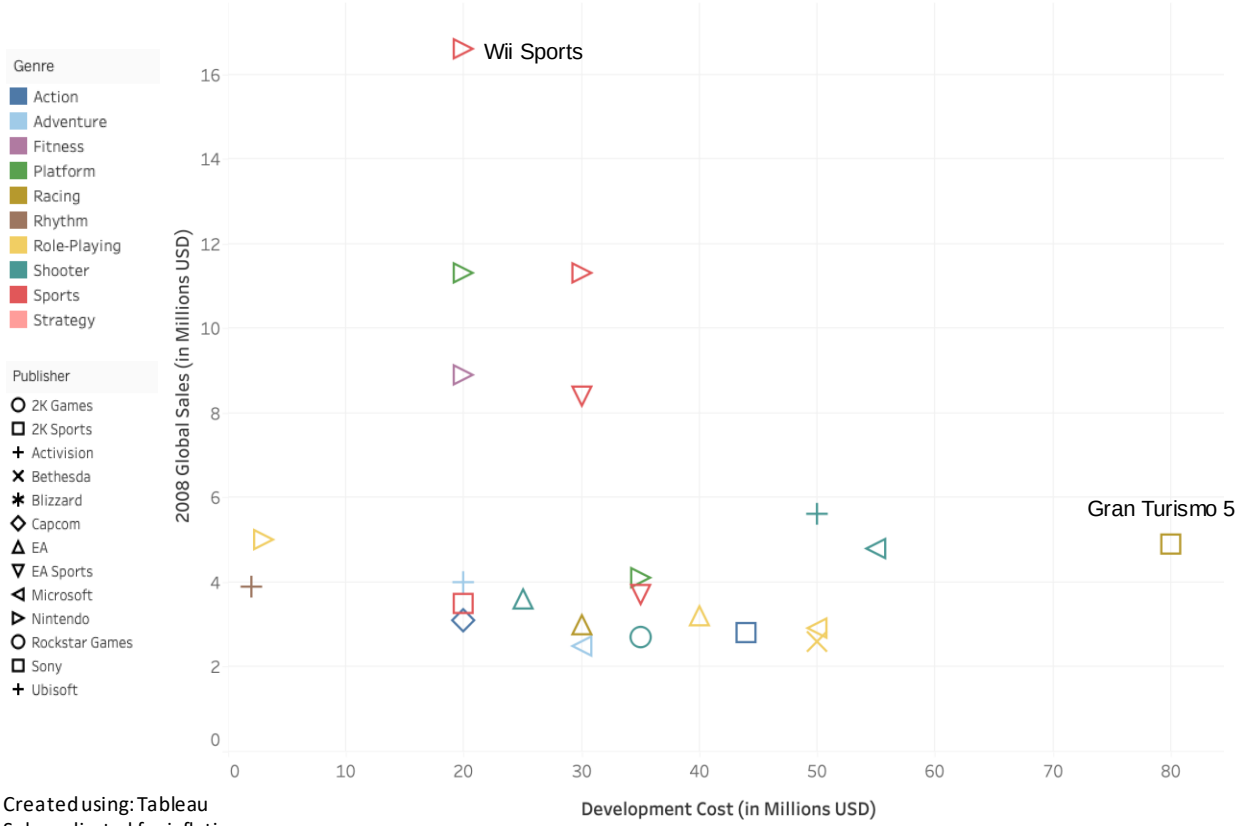
Created using: Tableau
Sales adjusted for inflation

Top 10 Performing Games of 2008: Physical Sales Revenue and Development Cost

Rank	Title	Publisher	Platform(s)	Genre	Sales (in Millions USD)	Development Cost (in Millions USD)
1	Wii Sports	Nintendo	Wii	Sports	16.6	20
2	New Super Mario Bros. Wii	Nintendo	Wii	Platform	11.3	20
3	Wii Sports Resort	Nintendo	Wii	Sports	11.3	30
4	Wii Fit Plus	Nintendo	Wii	Fitness	8.9	20
5	FIFA 11	EA Sports	Multi-platform	Sports	8.4	30
6	Call of Duty: Black Ops	Activision	Multi-platform	Shooter	5.6	50
7	Red Dead Redemption	Rockstar Games	Multi-platform	Adventure	5.2	100
8	Pokemon HeartGold and SoulSilver	Nintendo	Nintendo DS	Role-Playing	5	3
9	Gran Turismo 5	Sony	PS3	Racing	4.9	80
10	Halo: Reach	Microsoft	Xbox 360	Shooter	4.8	55

Created using: Excel
Sales adjusted for inflation

Top 25 Performing Games of 2008: Physical Sales and Development Cost by Genre and Publisher

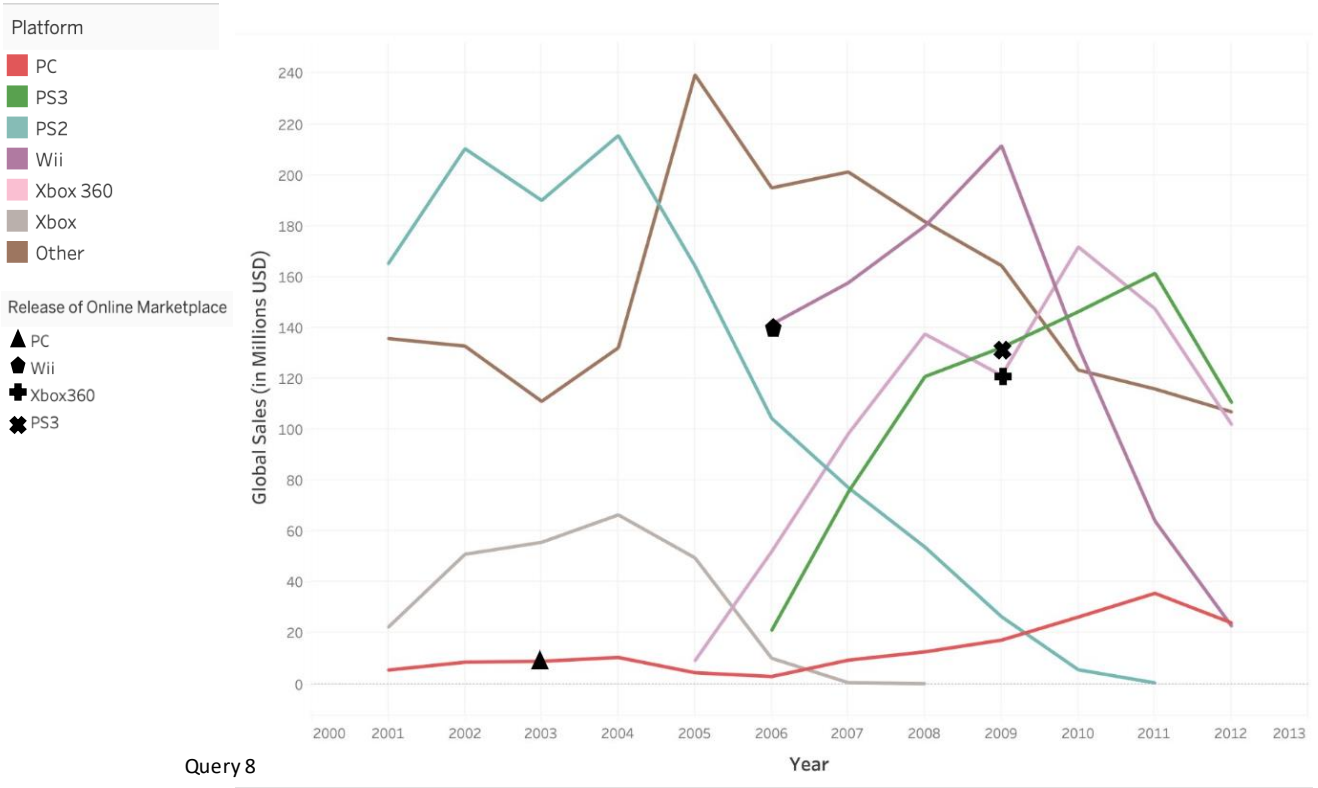


- Wii Sports has the highest revenue with $16.6 million dollars in physical sales
  - This may be because the game was also packaged with the Wii platform as a bundle
- Note that the development costs generally are significantly higher than the revenue
  - This shows that in the peak of physical sales in 2008 the most significant portion of revenue was likely online sales

Created using: Tableau
Sales adjusted for inflation

Analysis of Gaming Platform Revenue During Online Marketplace Introduction (2010)

Timeline for Release of Online Marketplaces (2001 – 2012)



Query 8

- PC games led this trend, with publisher Valve launching Steam as an online marketplace for their titles
  - Steam did not feature any non-Valve games until 2006
  - Cross-platform games from platforms such as Xbox360 and PS3 were only available as physical copies for PC until 2011, which is why PC games see a slight increase in sales after online marketplaces are introduced
- The release of online marketplaces for Xbox360 and PS3 normalized digital downloads, leading to higher use of the Shop Channel for Wii and decreased physical sales

Created using: Tableau
Sales adjusted for inflation

2010 Snapshot of Revenue by Genre, Platform, and Publisher

Genres	
Action	$69.9m
Puzzle	$10.5m
Racing	$25.5m
Role-Playing	$64.m
Shooter	$48.1m
Simulation	$17.5m
Sports	$61.1m
Other	$150.5m
Total	$447.2m

Query 9

Platforms	
PC	$17.6m
PS3	$93.2m
Wii	$113.8m
X360	$121.9m
Other	$100.8m
Total	$447.2m

Query 8

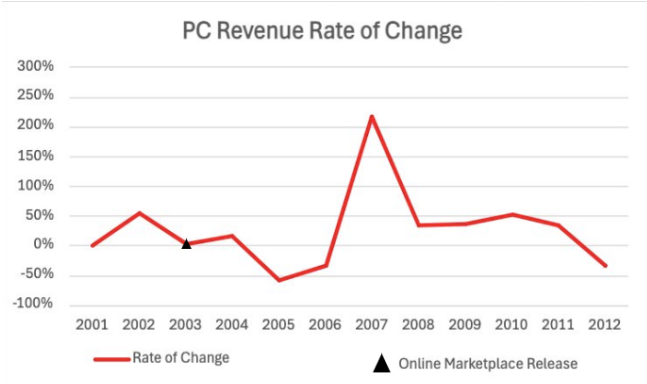
Publisher	
Bethesda Softworks	$4.1m
Codemasters	$1.6m
Electronic Arts	$41.1m
LucasArts	$1.6m
Microsoft Game Studios	$49.2m
MTV Games	$4.5m
Take-Two Interactive	$20.3m
Other	$325.m
Total	$447.2m

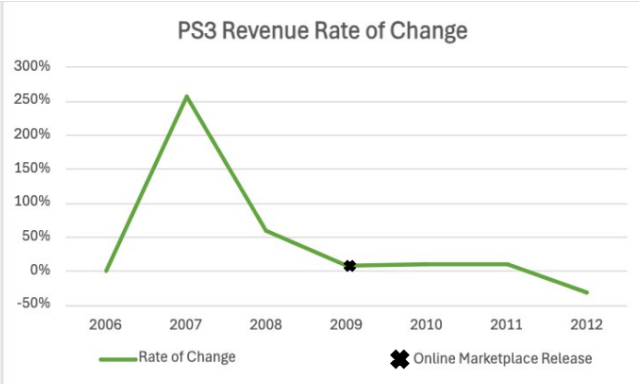
Query 10

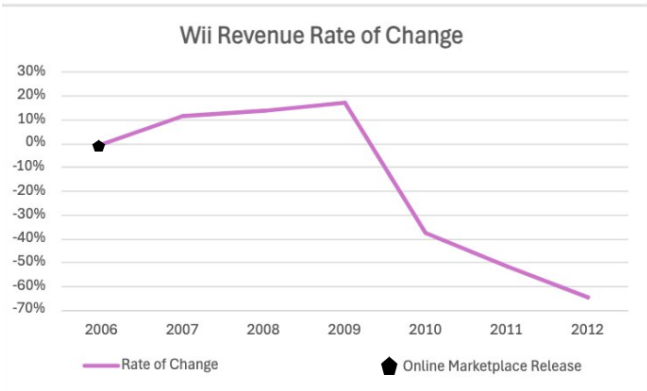
In 2010, the top seven publishers accounted for only 27.3% of physical copy revenue, highlighting the diversity among video game publishers. Microsoft Game Studios achieved great success this year making their own motion-sensor controller, called a Kinect Remote, to be used with Xbox 360. Their top-selling game was Kinect Adventures, generating $21.8 million in revenue, likely because it was packaged with the Kinect remote.

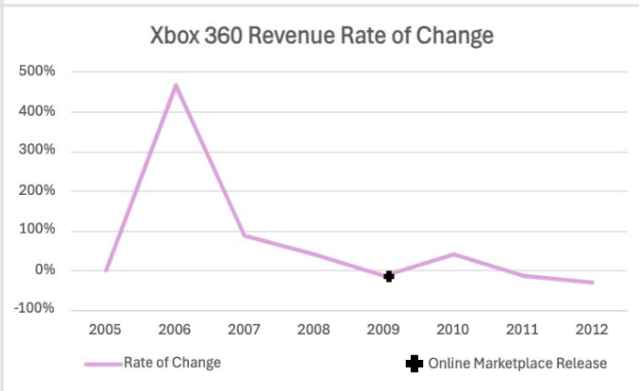
Created using: Tableau
Sales adjusted for inflation

Rate of Change in Revenue for Each Popular Platform







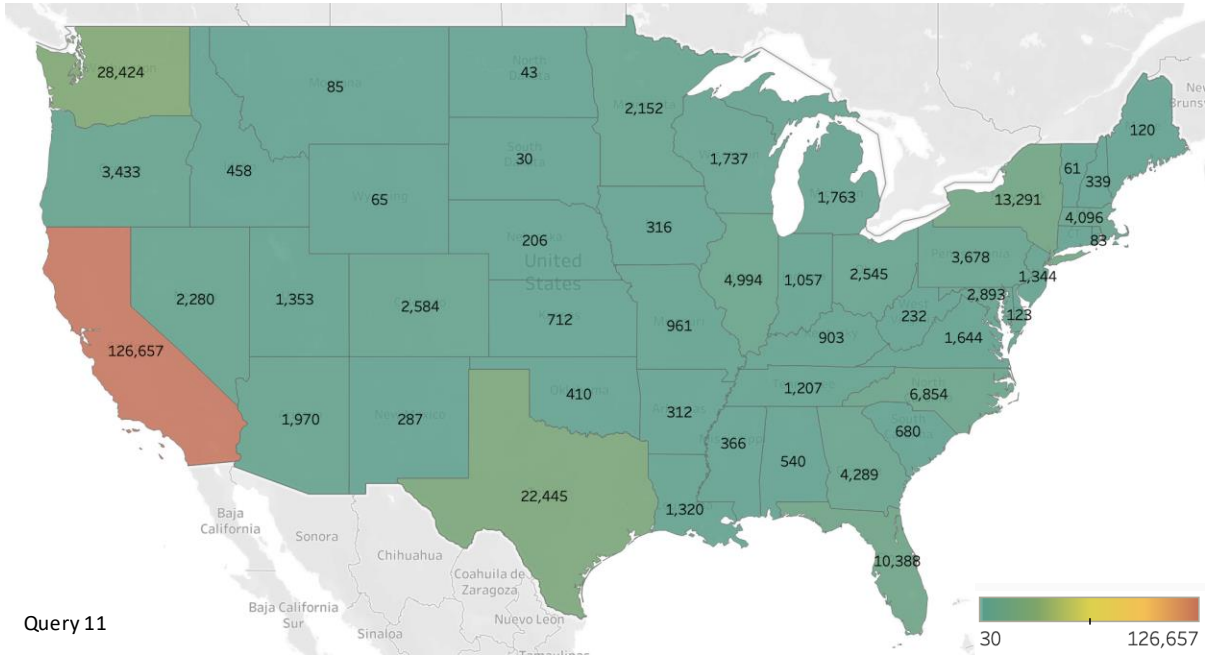


- The Wii platform achieved such success when it was released in 2006 that as online marketplaces became normalized after 2009, physical copy Wii games experienced the heaviest decline in physical copy revenue out of the four major consoles
- PC physical copy sales were the most erratic, as the market appeared to depend most upon if games popular during a specific year were available for multiple platforms

Created using: Excel
Sales adjusted for inflation

Videogame Industry Impact on Present-Day (2023)

Number of Jobs Created by Videogame Industry (2023)

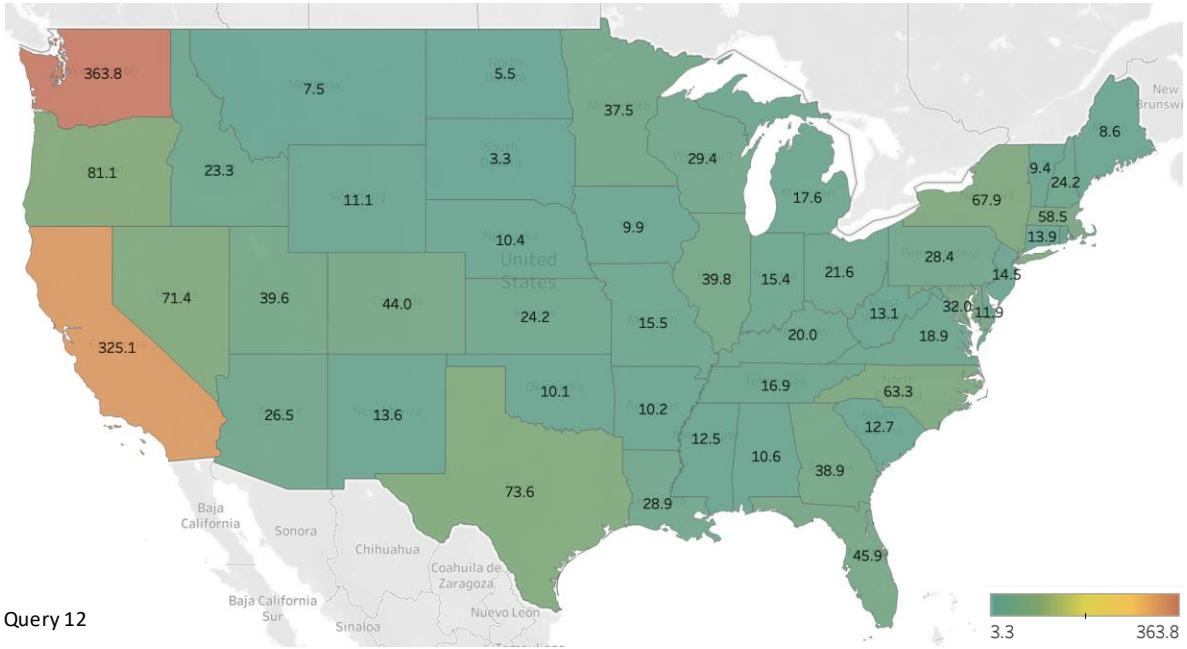


Query 11

- California has the most activity in the videogame industry, with 126,657 jobs created
  - Washington and Texas place a distant second and third place with 28,424 and 22,445 jobs, respectively
- California appears to be a hot spot for the videogame industry due to its historical role in the entertainment industry in general

Created using: Tableau
Sales adjusted for inflation

Videogame Industry Jobs Per 100,000 People (2023)



Query 12

- These ratios show the number of jobs created for the videogame industry per every 100,000 people in the working population
- Washington has a bigger ratio of affected jobs than other states, suggesting that the videogame industry is incredibly active there

Created using: Tableau
Sales adjusted for inflation

Lessons Learned

- When creating graphics, Excel and Tableau were preferred for ease of use and quality of visualizations in most cases. In particular, Tableau has by far superior geographic mapping abilities.
- Basic EDA was conducted in Jupyter Notebooks using Pandas and SQL. This is the superior option to Excel as it scales the best. However, Excel works well when dealing with exported data or smaller samples.
  - DTale was a useful python library for EDA, giving much of the functionality of Excel within Jupyter Notebooks.
- Pandas and SQL were excellent tools for filtering and aggregating data hassle-free.
- ChatGPT shows promise as a tool for the future. However, the tool is still experimental. In particular, ChatGPT was most useful for doing general research and automating repetitive manual browser searches.
- When plotting data on geographic maps correlated to human activity, it is essential to include a map that factors in population size to allow you to compare activity between states. Otherwise, you will just end up creating a population map.

Appendix

Data Sources:

- https://www.kaggle.com/datasets/gregorut/videogamesales/data
- https://www.theesa.com/data-insights/
- https://www.census.gov/data/tables/time-series/demo/popest/2020s-state-total.html