Nintendo BI Project

Data Analysis of Top Nintendo Games: Insights for Business Intelligence

Tristen Morris

Objective & Goals

The Objective of this project is to analyze the relationships between game performance metrics and their sales to uncover actionable insights

Context: Understanding game success factors can drive future product development, marketing strategies, and supply chain optimization

Performance metrics will primary be represented in **Meta Score** and **User Score**. Coming from Metacritic.com, Meta Score represents the average of scores given to the game by "a diverse group of highly respected critics". The User score (also from Metacritic) reflects the average score that Metacritic Users have given the game.

Key Questions:

➤ What factors correlate with higher sales?

➤ Are User Scores or Meta (Metacritic) Scores better indicators of success?

Data Overview

NintendoGames.csv (172.7 kB)

Detail　Compact　Column

⚠ meta_score	⚠ title	⚠ platform	⚠ date	⚠ user_score
10	Hollow Knight	Switch	June 12, 2018	10
1094 total values	**1046** unique values	3DS 24% Switch 19% Other (626) 57%	Nov 19, 2006 1% TBA 1% Other (1067) 98%	**1094** total values
99	The Legend of Zelda: Ocarina of Time	N64	Nov 23, 1998	9.1
97	Super Mario Odyssey	Switch	Oct 27, 2017	8.9
97	The Legend of Zelda: Breath of the Wild	Switch	Mar 3, 2017	8.7
97	Super Mario Galaxy 2	WII	May 23, 2010	9.1

The primary data set (sourced from Kaggle here)
includes Nintendo games released from 1996 to 2023

Key Attributes:

➤ **User Score** (from Metacritic), 0-10

➤ **Meta Score** (from Metacritic), 0-100

➤ **Platform** (i.e, Switch, Wii, N64.. etc)

➤ **Genre** (i.e, Action, Kart, Puzzle.. etc)

➤ **Date** (Release Date)

➤ **Title** (Deluxes & DLCs are included in this dataset)

Data Preparation

The original data had missing values for meta_score, user_score, and esrb_rating. The 'date' column is also an Object data-type which needs correction.

To fix these issues and prepare the data for exploratory analysis, the following was performed:

- **Deletion** of rows will null data

- **Conversion** of the date column to Dtype:

  'datetime'

- **Insertion** of a 'release_year' column for

  easier grouping

```
Data columns (total 10 columns):
 #   Column        Non-Null Count   Dtype
---  ------        --------------   -----
 0   meta_score    656 non-null     float64
 1   title         656 non-null     object
 2   platform      656 non-null     object
 3   date          656 non-null     datetime64[ns]
 4   user_score    656 non-null     float64
 5   link          656 non-null     object
 6   esrb_rating   656 non-null     object
 7   developers    656 non-null     object
 8   genres        656 non-null     object
 9   release_year  656 non-null     int32
```
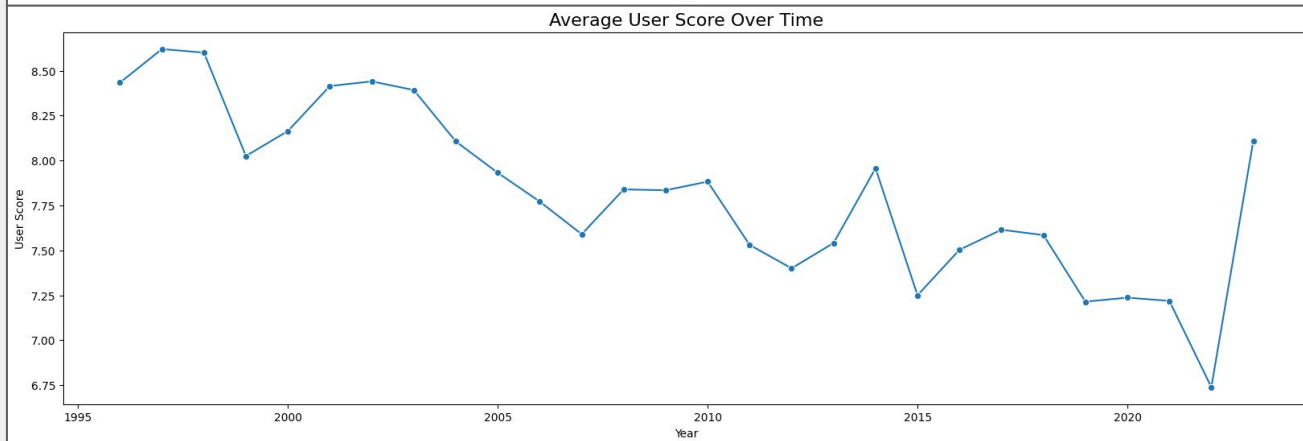
For the all code used, please view the Nintendo notebook in the Github Repository
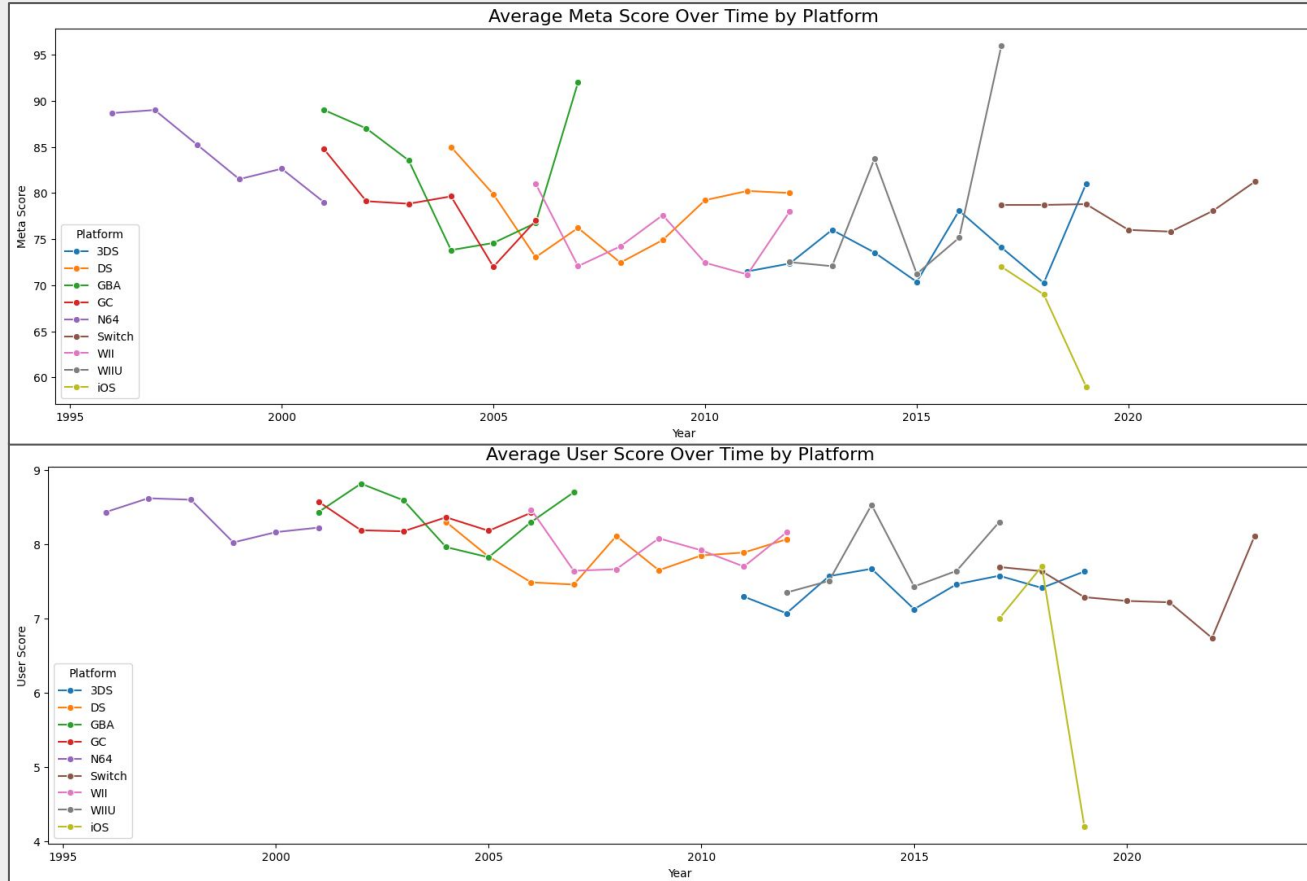
Exploratory Analytics - Scores over Time
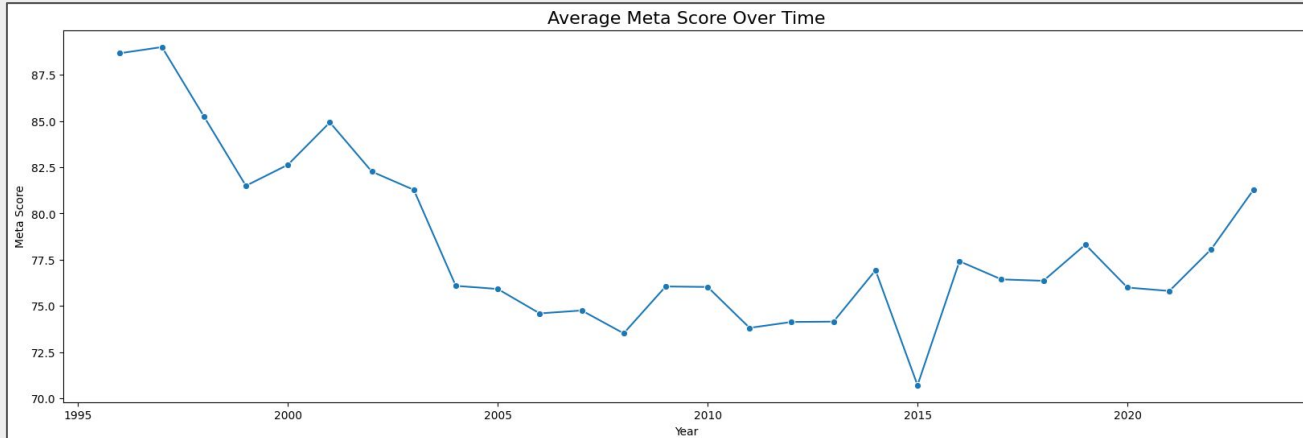
Each point on the graph represents the average Score of all games released that year.

We examine a **gradual decline** in both User and Meta scores over time, with a **short upwards trend** in Meta Scores in our recent data.

This data warrants more analysis. There are several peaks and drops rather than a consistent trend over time. This suggests other variables are affecting the Scores.

Exploratory Analytics - Scores by Platform

Average Meta Score Over Time by Platform

Average User Score Over Time by Platform

Each point on the graph represents the average Score of all games released that year onto a given platform.

We see that **The Switch** boasts a much higher average Meta Score than expected given the trend of decline over time. Suggesting that Platform can be a contributing variable to Scores.

User Score appears to follow the trend of decline, with the exception of a few outliers.

Exploratory Analytics - Scores by Genre

Last 5 Years

genre	average_meta_score
First-Person	94
Metroidvania	88
Open-World	87.11111111
Action RPG	85.75
Shooter	85.33333333
Music	85
Rhythm	85
Action Adventure	84.875
Linear	83.5
Stacking	83
Third-Person	83
Compilation	82
Platformer	81.8
Real-Time	81

All Observed Years

genre	average_meta_score
First-Person	83.25
Metroidvania	86.5
Open-World	88.02121212
Action RPG	82.53571429
Shooter	81.61176471
Music	74.81666667
Rhythm	74.55
Action Adventure	83.40217391
Linear	85.875
Stacking	74.66666667
Third-Person	72.05
Compilation	81.625
Platformer	81.18517455
Real-Time	81.54545455

(Note that not all genres are shown here)

These tables display **Meta Scores** grouped by **Genre** from all observed years (right) as well as a table for the last 5 years exclusively (left).

Looking for patterns in common Genres (Genres that appear >4 times in the past 5 years), we observe that some of the Genres that have done well historically and have done well in the last 5 years are:

- **Open-World**
- **Action RPG**
- **Action Adventure**
- **Linear**

User & Meta Score Correlation

Before we analyze how User & Meta Scores affect success, it is important to understand User Score & Meta Scores' correlation to each other.

A value of **0.63** suggests a **moderate to strong correlation** between User Score and Meta Score.

On average we would expect that a high User-Scoring game would also boast a high Meta Score.

Correlation Heatmap
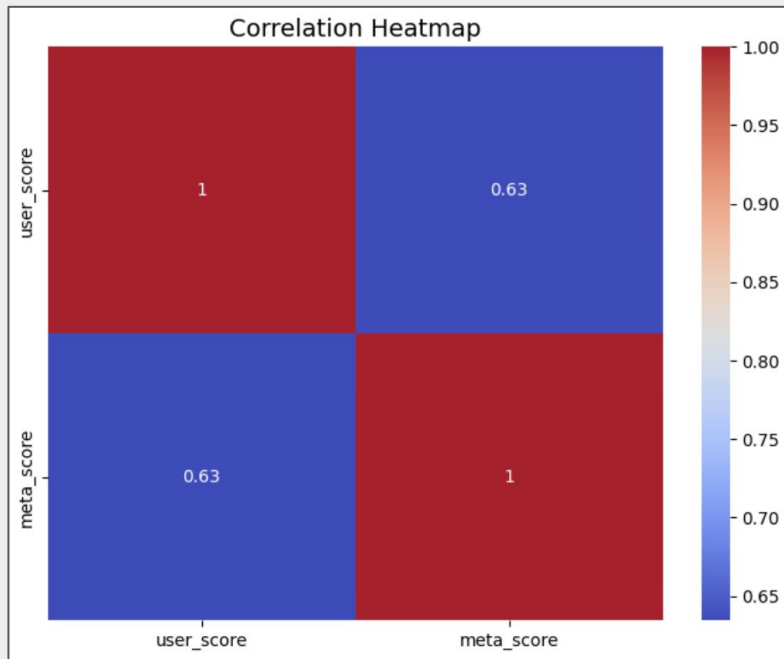
Sales Dataset

This additional dataset is a combination of some Nintendo sales data (Copies Sold per Title) & the Meta and User Scores from the original Kaggle data.

Considering the addition of a success metric (Copies Sold), we seek to answer a key question:

- **Which is a better metric of success: User Score or Meta Score?**

```
#    Column              Non-Null Count    Dtype
---  ------              --------------    -----
0    Title               57 non-null       object
1    (M) Copies Sold     57 non-null       float64
2    Copies Sold         57 non-null       float64
3    As of               57 non-null       object
4    Release             57 non-null       object
5    Genre               57 non-null       object
6    Developers          57 non-null       object
7    Publishers          57 non-null       object
8    Meta Score          57 non-null       int64
9    User Score          57 non-null       float64
```

Scores & Sales Correlation

The correlation between **User Score & Copies Sold** is **0.0006**, which suggest nearly no correlation.

The correlation between **Meta Score & Copies Sold** is **0.42**, which suggests a moderate correlation between the two.

With the previous larger dataset we obtained a correlation of **0.63** between User & Meta Scores. In this new, smaller dataset, we obtained a correlation of **0.64**. This suggests that our Sales data is a proper representative sample despite containing less data points.

Correlation Heatmap
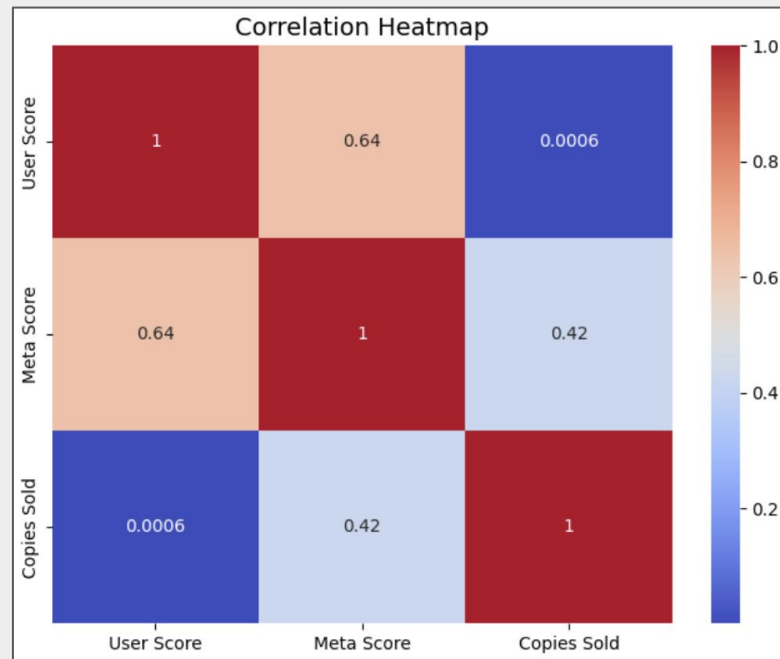
Visual Analysis - Meta Score Correlations

Log of Copies Sold vs Meta Score
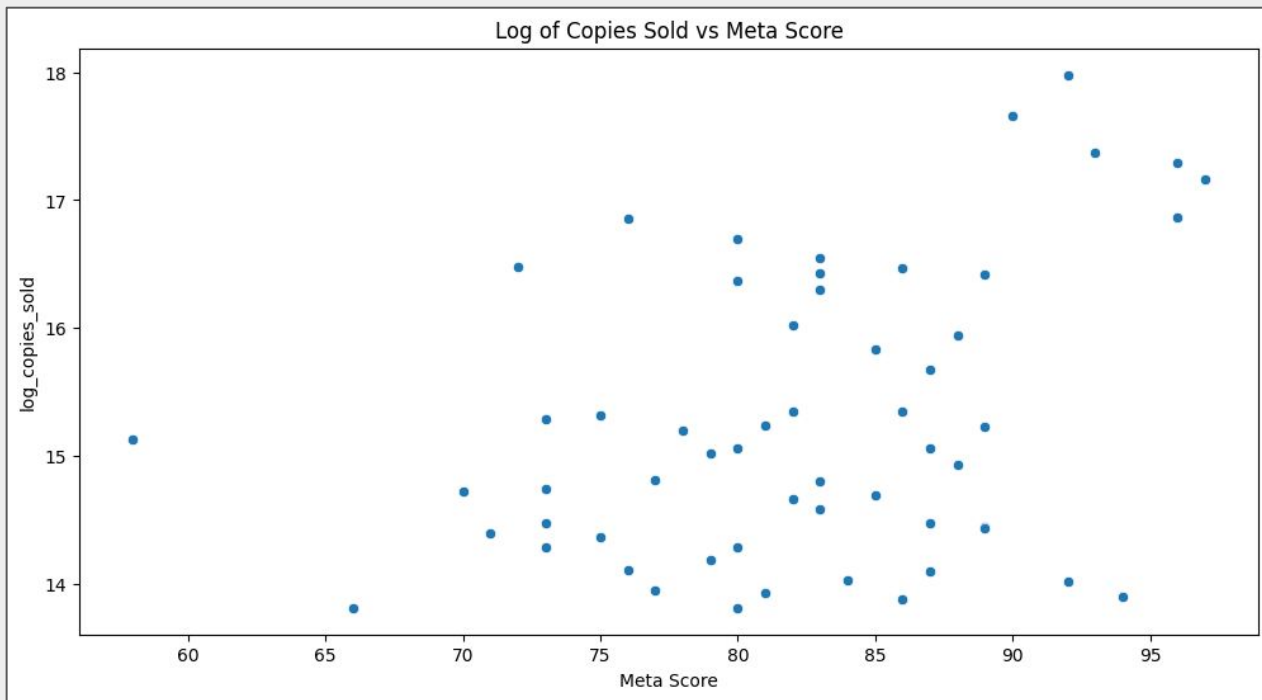
The range of Copies Sold is very large (1 million - 64 million), so plotting Copies Sold vs. Meta Score wouldn't be representative of their correlation.

Plotting the Log of Copies Sold vs. Meta Score provides a better visual representation.

Visually we observe a moderate correlation, but points also defy our expectations.

Ex: Some games rated 90+ have <14 Log of Copies Sold & a game rated <60 has >15 Log of Copies Sold.

Visual Analysis - User Score Correlations

Log of Copies Sold vs User Score
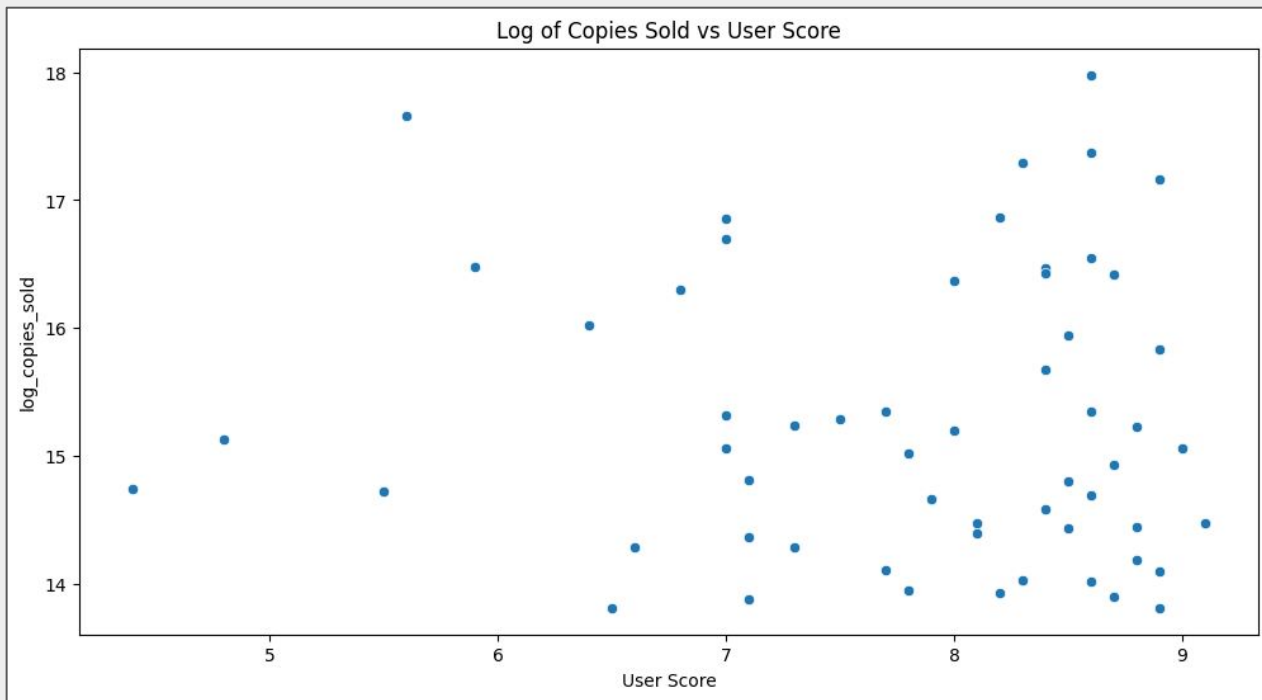
On the User Score plot we observe much less of a correlation, as expected by the heatmap results.

Numerous games were rated very highly by Users and sold comparatively poorly.

There were also some games that scored poorly (<7) and sold very well.

Conclusions & Findings

The original project aimed to answer these Key questions:

❯ **What factors correlate with higher sales?**
❯ **Are User Scores or Meta (Metacritic) Scores better indicators of success (sales)?**

Key Findings:

- With a moderate correlation of 0.42 compared to 0.0006, **Meta Score is a much better indicator of high sales than User Score.**

- Platform doesn't have a strong correlation on Meta Scores, however **platforms like The Switch, have overperformed expectations given recent & historical trends**.

- **Genres have a strong correlation with Meta Score**, and the following Genres have performed well both historically, and in the last 5 years:

    - Open-World
    - Action RPG
    - Action Adventure
    - Linear