**GameStop Corp.**

Case Study Part 2: Data Collection and Briefing Report

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DAMO-511-7: Winter 2025 Data Analytics Case Study 2

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March 12, 2025

**Introduction**

In this research paper, the group aims to analyze the Marketing and Sales Operations of GameStop, applying the PESTEL framework to understand the key external factors influencing the company's performance. Specifically, the group will focus on the Economic, Social, and Technological factors, as these are particularly relevant to GameStop's operations in the retail gaming industry. The objective of this analysis is to provide insights into how these external forces shape the company's marketing and sales strategies and their potential impact on overall business performance.

**Data Collection and Challenges**

The group encountered several challenges in acquiring relevant data for analysis. While the group had access to GameStop’s financial statements, obtaining comprehensive data for the PESTEL analysis proved to be difficult. The group explored various sources, including publicly available datasets, industry reports, and governmental databases. However, many of the datasets found were either incomplete, outdated, or misaligned with the group’s research objectives.

To bridge these gaps, the group employed web scraping techniques to extract data from corporate websites, industry reports and other relevant online sources. Additionally, the group leveraged AI tools for additional inputs and insights, and then manually encoded the dataset to ensure consistency and usability. The group then evaluated the relevance of the collected data sources to ensure that only valuable information will be incorporated into the analysis. This collaborative effort enabled the group to establish a well-structured dataset that aligns with the study's objectives.

**Table 1:** *Output of Data Collection*

A screenshot of a computer

AI-generated content may be incorrect.**Dataset Table and Variable Analysis**

Upon collecting the data, the team performed Exploratory Data Analysis (EDA) and Data Preprocessing using Python. The detailed steps and results have been fully documented in the ***gamestop-data-collection.pdf***. The list of tables below summarizes key details about the variables in each dataset table, which will be used later in Power BI. These variables were selected to evaluate operational risks and opportunities in GameStop’s business model, including:

* Industry trends in retail and gaming.
* Financial performance over time.
* The impact of NFTs and collectibles on revenue streams.
* Competitive landscape with other retailers.

**Table 2-1**: *Sales Table (Fact Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Company ID | Manually Defined Key | Nominal | It is a unique identifier for each company, used to distinguish between different companies. |
| Fiscal Year | Financial Reports | Ordinal | Represents the year in which the company’s fiscal period falls, typically in a sequential order. |
| Fiscal Quarter | Financial Reports | Ordinal | Represents a quarter within the fiscal year, which is sequential in nature (Q1, Q2, Q3, Q4). |
| Fiscal Month End | Financial Reports | Ordinal/Interval | Represents the last day of each month in the fiscal year, typically sequential and ordered. |
| Total Sales (USD) | Financial Reports | Ratio | Measures the total revenue in USD, with an absolute zero and meaningful ratios. |
| Total Units Sold | Product Website | Ratio | Measures the number of units sold, with an absolute zero and meaningful ratios (if applicable). |

**Table 2-2:** *Stock Price Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Company ID | Manually Defined Key | Nominal | It is a unique identifier for each company, used to differentiate companies. |
| Year | Stock Market Data | Ordinal | Represents the calendar year, with an inherent order (e.g., 2023, 2024). |
| Month | Stock Market Data | Ordinal/Interval | Represents the months each year, ordered sequentially (January to December). |
| Stock Ticker | Stock Market Data | Nominal | A unique identifier symbol for the stock, used to distinguish one company from another. |
| Stock Price (USD) | Stock Market Data | Ratio | Represents the value of a company's stock in USD, with a true zero point and meaningful ratios. |

**Table 2-3:** *Game Console Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Game Console ID | Manually Defined Key | Nominal | It is a unique identifier for each game console, used to distinguish between different consoles. |
| Manufacturer Name | Product Website | Nominal | Represents the name of the manufacturer (e.g., Sony, Microsoft), used to categorize consoles. |
| Console Model Name | Product Website | Nominal | Identifies the specific model of the console (e.g., PlayStation 5, Xbox Series X), used to differentiate consoles. |
| Release Date | Product Website / Industry Reports | Interval/Ratio | Represents the date the console was released, with meaningful intervals (e.g., months or years). |

**Table 2-4:** *Category Sales Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Category Name | Industry Reports | Nominal | It represents the classification of products which helps to categorize data. |
| Year | Industry Reports | Ordinal/Interval | Represents the calendar year, with an inherent order and meaningful intervals between years. |
| Total Sales (USD) | Industry Reports | Ratio | Measures total sales (e.g., in USD), with a true zero and meaningful ratios for comparison. |

**Table 2-5:** *Dept Sales Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Company ID | Manually Defined Key | Nominal | It uniquely identifies each company, helping to differentiate between companies. |
| Department | Financial Reports | Nominal | Categorizes the type of products sold (Hardware, Software, Collectibles), helping to distinguish sales across different departments. |
| Year | Financial Reports | Ordinal/Interval | Represents the calendar year, ordered in a meaningful sequence (e.g., 2023, 2024). |
| Total Sales (USD) | Financial Reports | Ratio | Represents total sales revenue in USD, with a true zero point and meaningful ratios. |

**Table 2-6:** *Top Games Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Game Name | Industry Reports | Nominal | Represents the specific name of the game, used to identify and distinguish between games. |
| Year | Industry Reports | Ordinal/Interval | Represents the calendar year, ordered in a meaningful sequence (e.g., 2023, 2024). |
| Total Shipped | Industry Reports | Ratio | Represents the total number of game units shipped, with a true zero point and meaningful ratios. |

**Table 2-7:** *NFT Sales Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Company ID | Manually Defined Key | Nominal | It uniquely identifies each company, helping to differentiate between companies. |
| Year | Trading Platform / Industry Reports | Ordinal/Interval | Represents the calendar year, ordered in a meaningful sequence (e.g., 2023, 2024). |
| Trading Volume (USD) | Trading Platform / Industry Reports | Ratio | Represents the total trading volume in USD, with a true zero point and meaningful ratios. |
| Total Users | Trading Platform / Industry Reports | Ratio | Represents the total number of users involved, with a true zero and meaningful ratios. |
| Notes | Industry Reports | Nominal/Ordinal | Contains additional information, often text-based or ordered data that may describe specific conditions or observations. |

**Table 2-8:** *Card Grading Sales Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Company ID | Manually Defined Key | Nominal | A unique identifier for each company, used to distinguish between different companies. |
| Year | Company Website / Industry Reports | Ordinal/Interval | Represents the calendar year, ordered in a meaningful sequence (e.g., 2023, 2024). |
| Total Sales (USD) | Company Website / Industry Reports | Ratio | Represents the total sales revenue in USD, with a true zero point and meaningful ratios. |
| Total Cards Graded | Company Website / Industry Reports | Ratio | Represents the total number of cards graded, with a true zero point and meaningful ratios. |
| Notes | Company Website / Industry Reports | Nominal/Ordinal | Contains additional information, often text-based or ordered data that may describe specific conditions or observations. |

**Table 2-9:** *Company Table (Dimension Table)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable Name** | **Source** | **Level of Measurement** | **Rationale for Selection** |
| Company ID | Manually Defined Key | Nominal | A unique identifier for each company, used to distinguish between different companies. |
| Company or Console Name | Company Website / Product Website | Nominal | Identifies the specific company or console, serving as a unique label for the entity. |
| Industry | Company Website / Industry Reports | Nominal | Represents the sector the company operates in (e.g., Tech, Entertainment), used to categorize companies. |
| Revenue Size | Company Website / Industry Reports | Ordinal | Represents the revenue size of the company (small, medium, large), ordered in terms of size categories. |
| Geographical Presence | Company Website / Industry Reports | Ordinal/Nominal | Indicates whether the company operates locally, regionally, or globally, either as categories or ordered levels. |
| Business Model Type | Company Website / Industry Reports | Nominal | Represents the business model of the company (e.g., B2B, B2C, subscription-based), used for classification. |
| Public or Private | Company Website / Industry Reports | Nominal | Distinguishes whether a company is publicly traded or privately held, an important classification. |

**Descriptive Statistics**

**Table 3-1**: *Sales Table (Fact Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A table with numbers and numbers  AI-generated content may be incorrect.  **Missing Values:**  A white background with black text  AI-generated content may be incorrect.  **Outlier Detection:** |

**Table 3-2:** *Stock Price Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a computer screen  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Table 3-3:** *Game Console Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a computer  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Table 3-4:** *Category Sales Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a graph  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Table 3-5:** *Dept Sales Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a graph  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Table 3-6:** *Top Games Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a calculator  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Table 3-7:** *NFT Sales Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a graph  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Table 3-8:** *Card Grading Sales Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a graph  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Table 3-9:** *Company Table (Dimension Table) Statistics, Missing Values & Outliers*

|  |
| --- |
| **Descriptive Statistics:**  A screenshot of a computer  AI-generated content may be incorrect.  **Missing Values:**    **Outlier Detection:** |

**Handling Missing Data**

**Table 4-1:** *Sales Table (Fact Table) Handling of Missing Data*

|  |
| --- |
| **Python Code:**    **Rationale:**  The missing **Total Units Sold was defaulted to 0** because this feature is only applicable to Gaming Consoles. The missingness only happens to records that are not related to Gaming Consoles. |

**Table 4-2:** *NFT Sales Table (Dimension Table) Handling of Missing Data*

|  |
| --- |
| **Python Code:**    **Rationale:**  The missing **Trading Volume (USD) and Total Users was imputed using forward fill while retaining 0 for the 1st date which is 2020.** Forward fill was utilized since the missing data follows a time-based or sequential pattern. |

**Table 4-3:** *Card Grading Sales Table (Dimension Table) Handling of Missing Data*

|  |
| --- |
| **Python Code:**    **Rationale:**  The missing **Trading Sales (USD) was imputed using forward fill while retaining 0 for the 1st date which is 2020.** Forward fill was utilized since the missing data follows a time-based or sequential pattern. |

**Table 4-4:** *Company Table (Dimension Table) Handling of Missing Data*

|  |
| --- |
| **Python Code:**    **Rationale:**  The missing **Revenue Size was imputed with a "Not Available" value** to signify data that data was unavailable at the time of capture. |

**Handling Outliers**

For the Sales Table, which includes **Total Sales (USD)**, no action was taken, as the data represents historical sales from multiple companies and may naturally contain outliers due to variability in sales volumes. These outliers will be identified and visualized during the analysis.

Similarly, for the Category Sales Table, which also reflects **Total Sales (USD)**, no action was taken as it represents historical data from different companies. Outliers are expected, and their impact will be analyzed and visualized.

In the case of NFT Sales Table, specifically **Trading Volume (USD)** and **Total Users**, no action was taken since these are historical data points that may include outliers due to market fluctuations. These outliers will be visualized and considered during the analysis.

Lastly, for Card Grading Sales Table, which tracks **Total Cards Graded**, no action was taken as this historical data may include potential outliers caused by variations in grading volumes across different companies. These outliers will also be visualized and analyzed.

**Conclusion**

In conclusion, this research paper provides a comprehensive analysis of GameStop's Marketing and Sales Operations through the lens of the PESTEL framework, focusing on the Economic, Social, and Technological factors. Despite challenges in data collection, the team utilized web scraping, AI tools, and manual encoding to build a robust and consistent dataset. This completed dataset, now fully prepared, is ready for further analysis and visualization in Power BI. The insights derived from this research will enhance the understanding of how external factors influence GameStop's marketing and sales strategies, contributing to a deeper analysis of the company's business performance.

**References**

Best Buy. (n.d.). *Quarterly results.* Retrieved from https://investors.bestbuy.com/financials/quarterly-results/default.aspx.

Blur. (n.d.). *Blur blog.* Retrieved from https://blur.io/blog.

Card Ladder. (n.d.). *Sports card market analysis.* Retrieved from https://www.cardladder.com.

Chainalysis. (n.d.). *Blockchain analytics and insights.* Retrieved from https://www.chainalysis.com.

Coindesk. (n.d.). *NFT market insights.* Retrieved from https://www.coindesk.com.

CoinGecko. (n.d.). *Crypto and NFT market overview.* Retrieved from https://www.coingecko.com.

Collectors Universe. (n.d.). *Sports card grading and authentication.* Retrieved from https://www.collectorsuniverse.com.

CoinMarketCap. (n.d.). *NFT price tracking.* Retrieved from https://coinmarketcap.com.

CryptoSlam. (n.d.). *NFT market data.* Retrieved from https://www.cryptoslam.io.

DevToDev. (2023, March). *Game market overview: Important reports published in March 2023.* Retrieved from https://www.devtodev.com/resources/articles/game-market-overview-the-most-important-reports-published-in-march-2023.

Dune Analytics. (n.d.). *OpenSea analysis.* Retrieved from https://dune.com/siege/OpenSea.

GameStop. (2024). *Fourth quarter and fiscal year 2023 results.* Retrieved from https://investor.gamestop.com/news-releases/news-release-details/gamestop-reports-fourth-quarter-and-fiscal-year-2023-results.

GameStop. (2024). *Third quarter 2024 results.* Retrieved from https://investor.gamestop.com/news-releases/news-release-details/gamestop-discloses-third-quarter-2024-results.

Macrotrends. (n.d.). *Amazon revenue 2010-2024.* Retrieved from https://www.macrotrends.net/stocks/charts/AMZN/amazon/revenue.

Macrotrends. (n.d.). *Funko revenue 2010-2024.* Retrieved from https://www.macrotrends.net/stocks/charts/FNKO/funko/revenue.

Macrotrends. (n.d.). *GameStop revenue 2010-2024.* Retrieved from https://www.macrotrends.net/stocks/charts/GME/gamestop/revenue.

Macrotrends. (n.d.). *Walmart revenue 2010-2025.* Retrieved from https://www.macrotrends.net/stocks/charts/WMT/walmart/revenue.

Microsoft. (n.d.). *Investor relations.* Retrieved from https://www.microsoft.com/en-us/Investor.

Miniso. (n.d.). *Investor relations.* Retrieved from https://ir.miniso.com/.

Nintendo. (n.d.). *Investor relations.* Retrieved from https://www.nintendo.co.jp/ir/en/index.html.

NonFungible. (n.d.). *NFT trends and marketplace data.* Retrieved from https://nonfungible.com.

OpenSea. (n.d.). *OpenSea blog.* Retrieved from https://opensea.io/blog.

PSA Card. (n.d.). *Professional sports authenticator (PSA).* Retrieved from https://www.psacard.com.

Sensor Tower. (n.d.). *State of mobile gaming 2024.* Retrieved from https://sensortower.com/blog/state-of-mobile-gaming-2024.

Sony. (n.d.). *Investor relations.* Retrieved from https://www.sony.net/SonyInfo/IR/.

Sports Collectors Daily. (n.d.). *Sports collectibles news and insights.* Retrieved from https://www.sportscollectorsdaily.com.

Statista. (n.d.). *Global digital gaming revenue statistics.* Retrieved from https://www.statista.com/statistics/1344686/global-digital-gaming-revenue/.

Statista. (n.d.). *NFT market research and statistics.* Retrieved from https://www.statista.com.

The Block. (n.d.). *NFT trends and analysis.* Retrieved from https://www.theblock.co.

The Guardian. (2024, September 11). *Sony reveals $700 PlayStation 5 Pro console.* Retrieved from https://www.theguardian.com/games/article/2024/sep/11/sony-reveals-700-playstation-5-pro-console.

Wikipedia. (n.d.). *Nintendo Switch.* Retrieved from https://en.wikipedia.org/wiki/Nintendo\_Switch.

Wikipedia. (n.d.). *PlayStation 5.* Retrieved from https://en.wikipedia.org/wiki/PlayStation\_5.

Wikipedia. (n.d.). *Xbox Series X and Series S.* Retrieved from https://en.wikipedia.org/wiki/Xbox\_Series\_X\_and\_Series\_S.

WN Hub. (n.d.). *Gaming market analysis.* Retrieved from https://wnhub.io/news/other/item-46612.

VGChartz. (n.d.). *Video game sales ranking.* Retrieved from https://www.vgchartz.com/games/games.php.

Yahoo Finance. (n.d.). *GameStop historical stock data.* Retrieved from https://finance.yahoo.com/quote/GME/history/.