FILM INDUSTRY ANALYSIS: REVENUE AND RATINGS TRENDS

Fredo Alejos

Iba Demesy

Manuel Maya

INTRODUCTION

How are movie revenues and cast according to Box Office Mojo in the 2001-2023 period related to their ratings in IMDb?

Motivation: Analyzing the cast and quality of a film project can help an investor know what parameters to take into account when investing both during and before production.

BACKGROUND

ON FILM INDUSTRY ANALYSIS

CONTEXT FOR FILM INDUSTRY

The support for film projects is becoming less stable and reform proposals to improve this have been made (Y Vorontsova, 2023).

The number of feature films produced has greatly increased, leading to a greater number of investors (China Quarterly).

Digital technologies and "big data" can enhance the cinema experience, adapting some of it to consumer preferences (C. Weinberg et al., 2020).

RELATED LITERATURE

CHIU, Y. ET AL. (2022). STUDY OF THE SALES IMPACT (ACCORDING TO BOX OFFICE) OF THE CRITICAL REVIEWS AND USER REVIEWS (FROM METACRITICS).

Graph 1. Dataflow for forecasting in another project

- Some features of compatibility allowed to use up to 200 important movies during recent years.
- The main objective was a forecasting system for the expected revenue.
- Finally they concluded that there is a subtle but clear relationship.
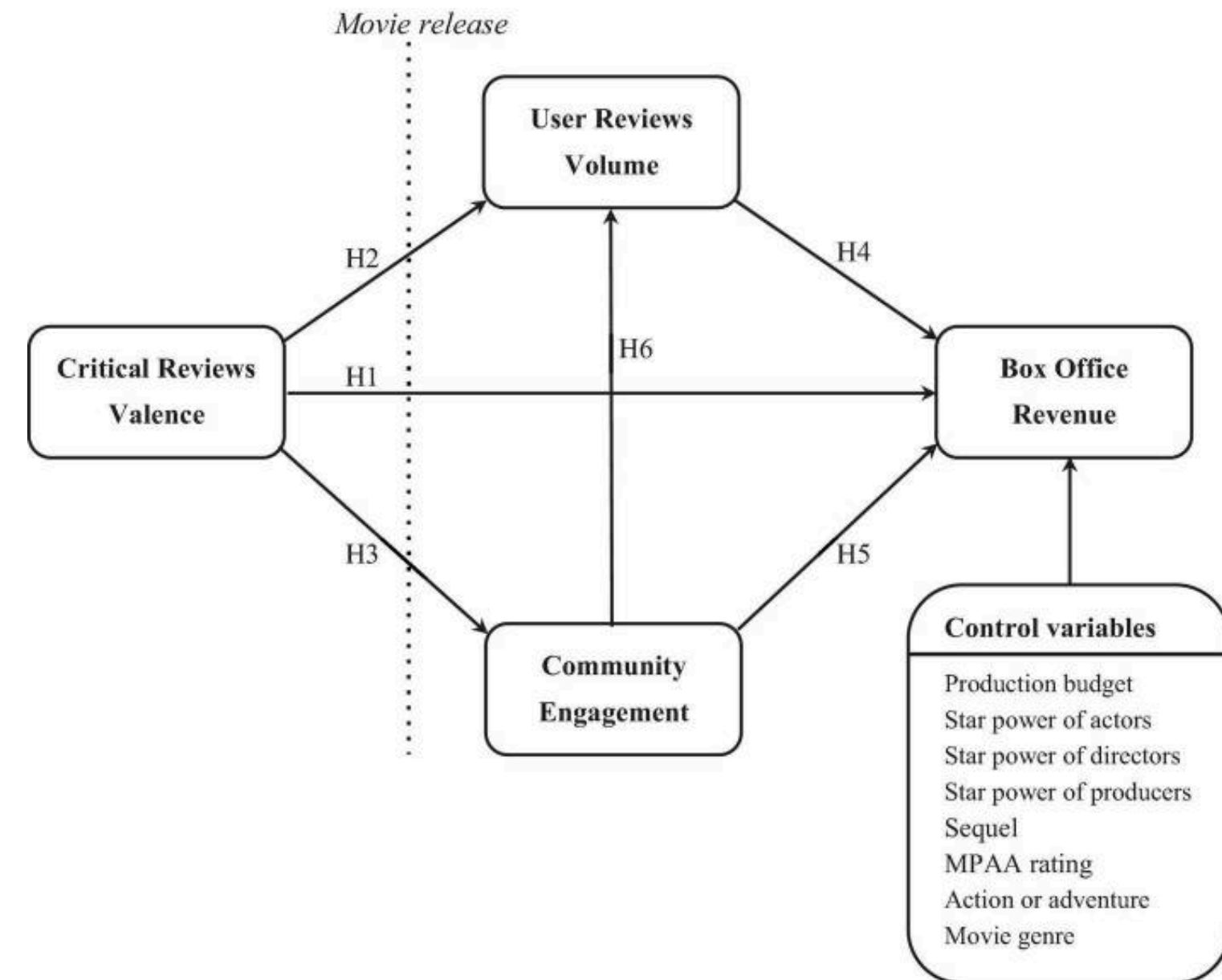
INTERNET MOVIE DATABASE (IMDB) AND BOX OFFICE MOJO OFFICE

- More than 200 millions of monthly visitors each one.
- Almost 700 thousands movie titles and features
- The most famous films database.

K. Dodds (2006),"Popular geopolitics and audience dispositions:
James Bond and the Internet Movie Database (IMDb)"

A. Oghina et al. (2012), "Predicting IMDB Movie Ratings Using Social Media"

N. Quader et al. (2017), "A machine learning approach to predict movie box-office success"

DATA COLLECTION STRATEGY

METHODS	STRATEGY	DESCRIPTION

DATA COLLECTION

- **Our Approach:** Data was extracted using web scraping with Python. Selenium handled dynamic content effectively in the absence of an official API.

- **Defining the Data:** Focused on movies from 2001 to 2023, excluding documentaries and shorts, with at least 200 votes.

- **Dataset:** For a comprehensive analysis we extracted movie title, rating, unique ID (for Box Office Mojo), revenues, and cast/crew information.

DATA COLLLECTION STRATEGY

IMDB - Filters

DATA COLLLECTION STRATEGY

IMDB - Selenium

DATA COLLLECTION STRATEGY

BoxOfficeMojo - Selenium

OVERCOMING OBSTACLES

- **Incomplete Data:** Some fields were inconsistently available, with certain entries containing the information while others were left blank

- **Dynamic Page Issues:** Frequent page refreshes caused values to shift or change locations. For example, in the initial IMDb dataset, the duration overlapped with the release year and other fields, making the data extraction process more complex.

- **Execution Time:** Extracting the datasets with selenium required significant runtime, the prolonged process ultimately led to kernel failures, preventing us from capturing all desired information.

DATA DESCRIPTION

7000 films collected

Table 1: Data set overview: Selected movies with ratings and worldwide gross revenue.

Title	Rating	Worldwide Gross (in M$)	Director	Actors
The Dark Knight	9.0	1004	Christopher Nolan	Christian Bale (Batman), Heath Ledger (Joker)
Inception	8.8	836	Christopher Nolan	Leonardo DiCaprio, Joseph Gordon-Levitt
Avatar	7.9	2847	James Cameron	Sam Worthington, Zoe Saldana

Sources: IMDb for ratings, BoxOfficeMojo for the worldwide gross and cast.

DATA DESCRIPTION

Graph 2: Distribution of Ratings
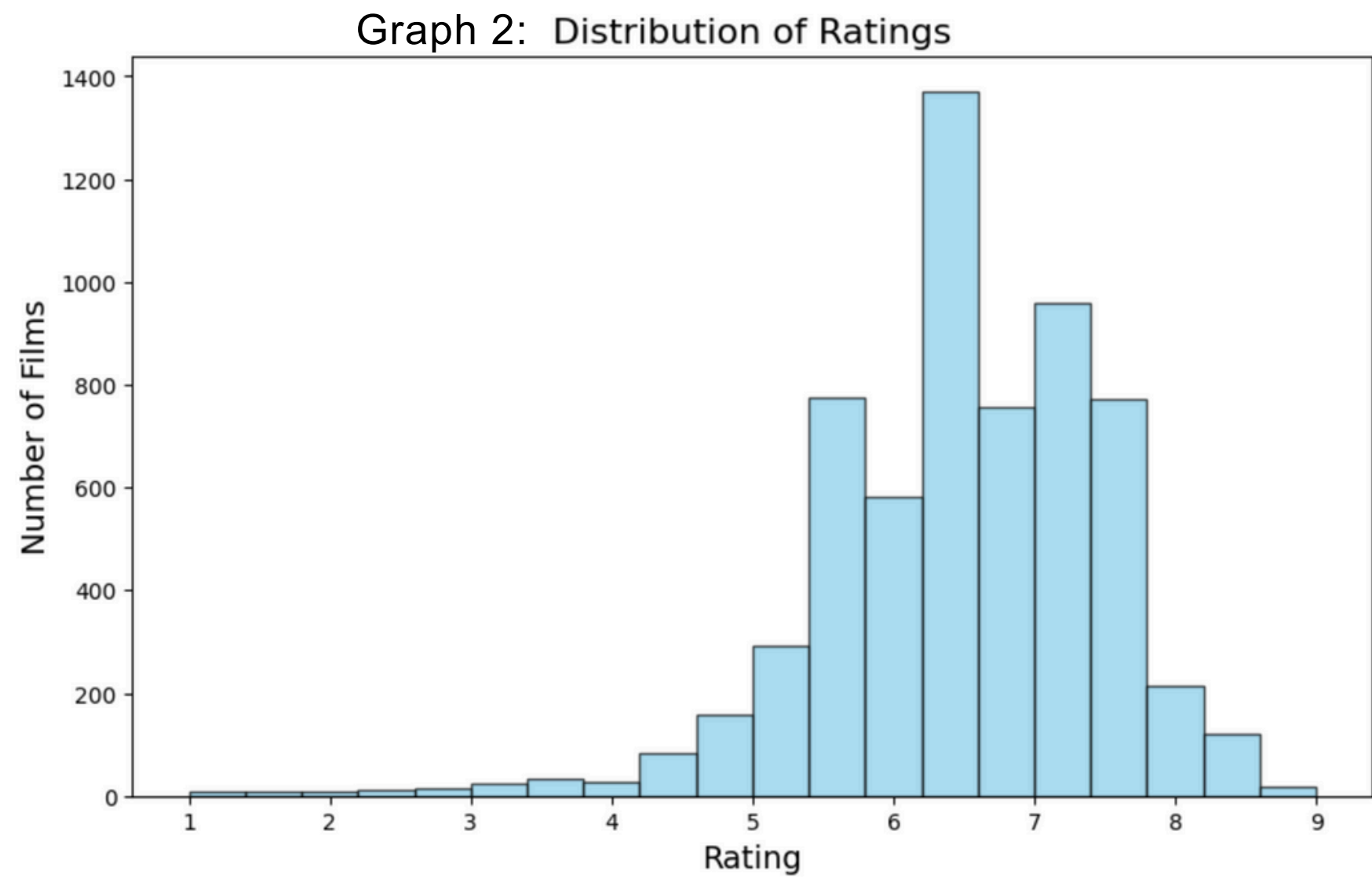
Table 2: Descriptive statistics for ratings and worldwide gross.

Variable	Average	Median	Standard Deviation	Q1 (25th Percentile)	Q3 (75th Percentile)
Rating	6.5	6.6	1.0	6.0	7.2
Worldwide Gross (in M$)	89	21	189	3	87

Sources: IMDb for ratings, BoxOfficeMojo for the worldwide gross.

DATA ANALYSIS

RATINGS   ACTORS AND   REVENUES
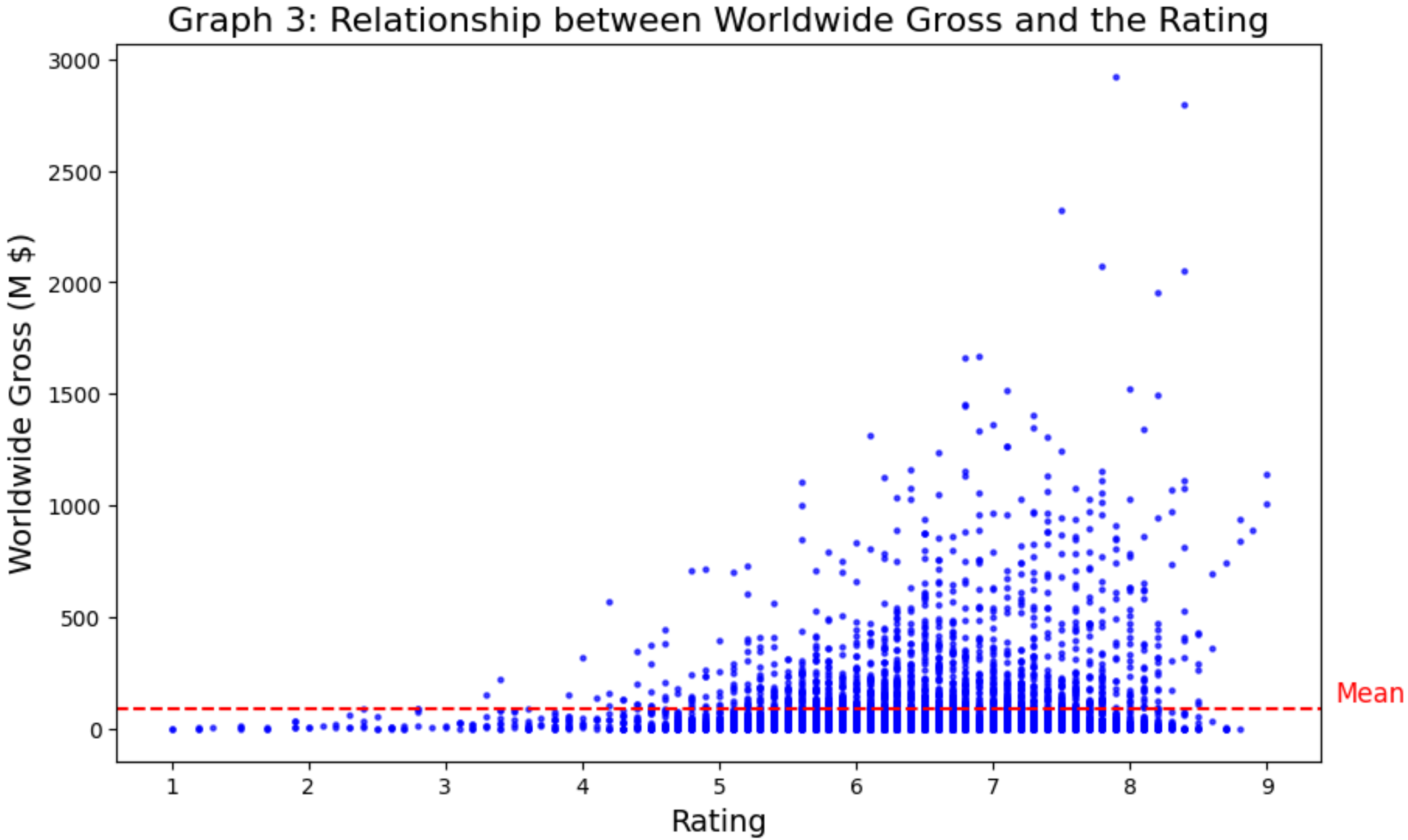   FILM DIRECTORS

Graph 3: Relationship between Worldwide Gross and the Rating

DATA ANALYSIS   DIRECTORS

Table 3: Top directors by average worldwide gross revenue.

Director	Average Revenue (in M$)	Number of Films
Anthony Russo	1140	6
Peter Jackson	820	8
David Yates	800	8
J.J. Abrams	780	6
Sam Raimi	670	6
Christopher Nolan	620	10
Michael Bay	540	10
Bryan Singer	530	6
Jon Favreau	490	9
Francis Lawrence	460	8

Note: With a minimum of 5 films. **Sources:** BoxOfficeMojo for the worldwide gross and cast.

- **Franchise dominance:** Marvel, Lord of the Rings, Transformers

Table 4: Top directors by average rating.

Director	Average Rating	Number of Films
Christopher Nolan	8.22	10
Quentin Tarantino	8.03	8
Peter Jackson	7.94	8
Denis Villeneuve	7.78	8
Martin Scorsese	7.76	7
Hirokazu Koreeda	7.66	7
Asghar Farhadi	7.66	7
S. Shankar	7.65	6
Bong Joon Ho	7.63	6
Nuri Bilge Ceylan	7.63	7

- **High ratings, limited filmography:** Top ratings with relatively few films, indicating consistent quality.

Note: With a minimum of 5 films. **Sources:** IMDb for ratings, BoxOfficeMojo for the cast.

Table 5: Top actors by average worldwide gross revenue.

Actor	Average Worldwide Gross (in M$)	Number of Films
Robert Downey Jr.	617	25
Vin Diesel	436	21
Chris Evans	421	28
Tom Cruise	412	21
Will Smith	362	20
Dwayne Johnson	329	37
Mark Ruffalo	317	29
Jack Black	292	24
Johnny Depp	284	33
Daniel Craig	276	21

Note: With a minimum of 15 films. **Sources:** BoxOfficeMojo for the worldwide gross and cast.

- **Franchise dominance:** Downey Jr. and Diesel lead, driven by Marvel and Fast & Furious.

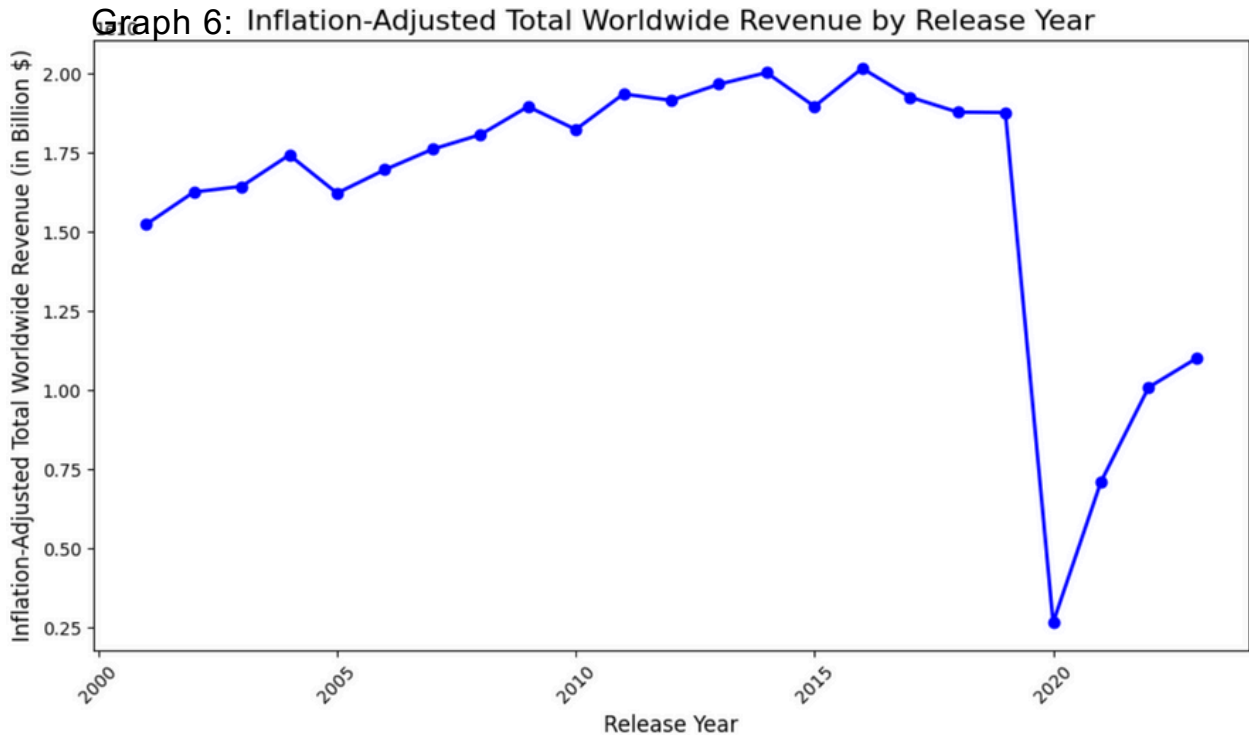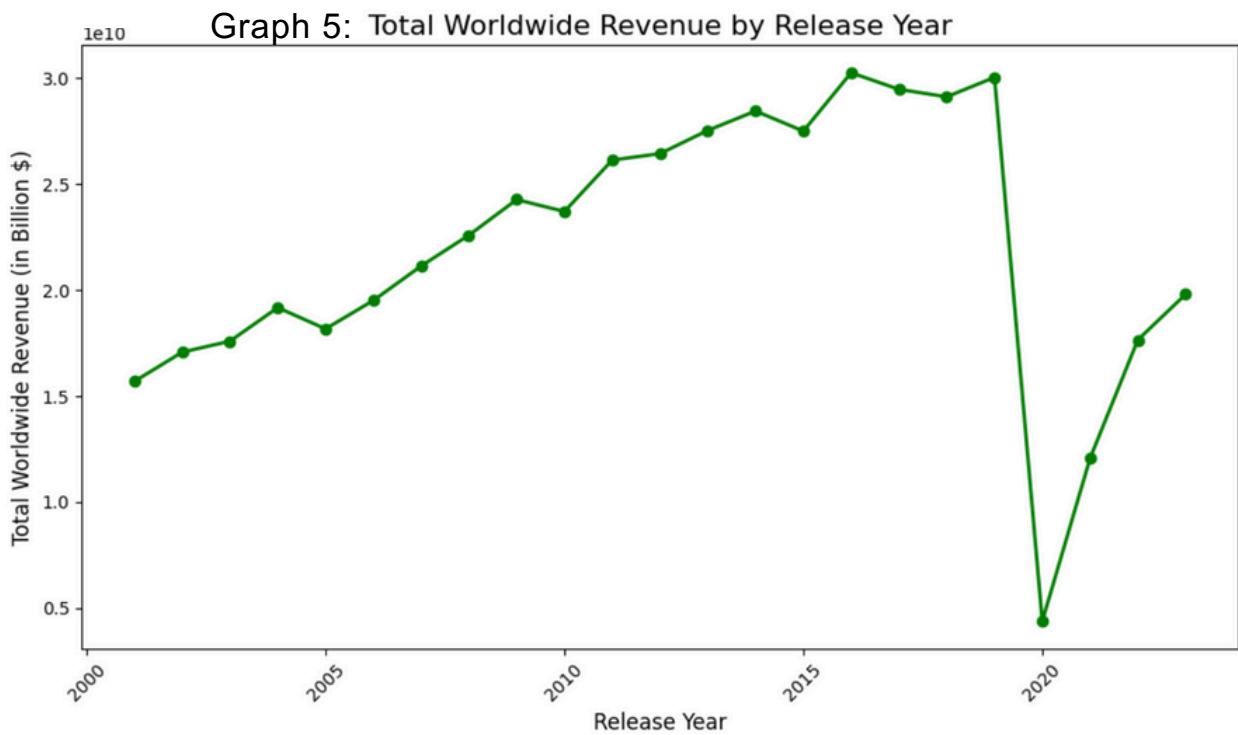Table 6: Top actors by average rating and notable performances.

Actor	Average Rating	Number of Films
Leonardo DiCaprio	7.75	17
Robert Downey Jr.	7.25	25
Ajay Devgn	7.21	17
Philip Seymour Hoffman	7.21	19
Mads Mikkelsen	7.15	17
Brad Pitt	7.08	27
Ryan Gosling	7.05	23
Emma Watson	7.05	16
Christian Bale	7.05	29
Tom Cruise	7.03	20

Note: With a minimum of 15 films. **Sources:** IMDb for ratings, BoxOfficeMojo for the cast.

DATA ANALYSIS   REVENUES

Graph 4: International Gross Comparison (Top 10 Movies)
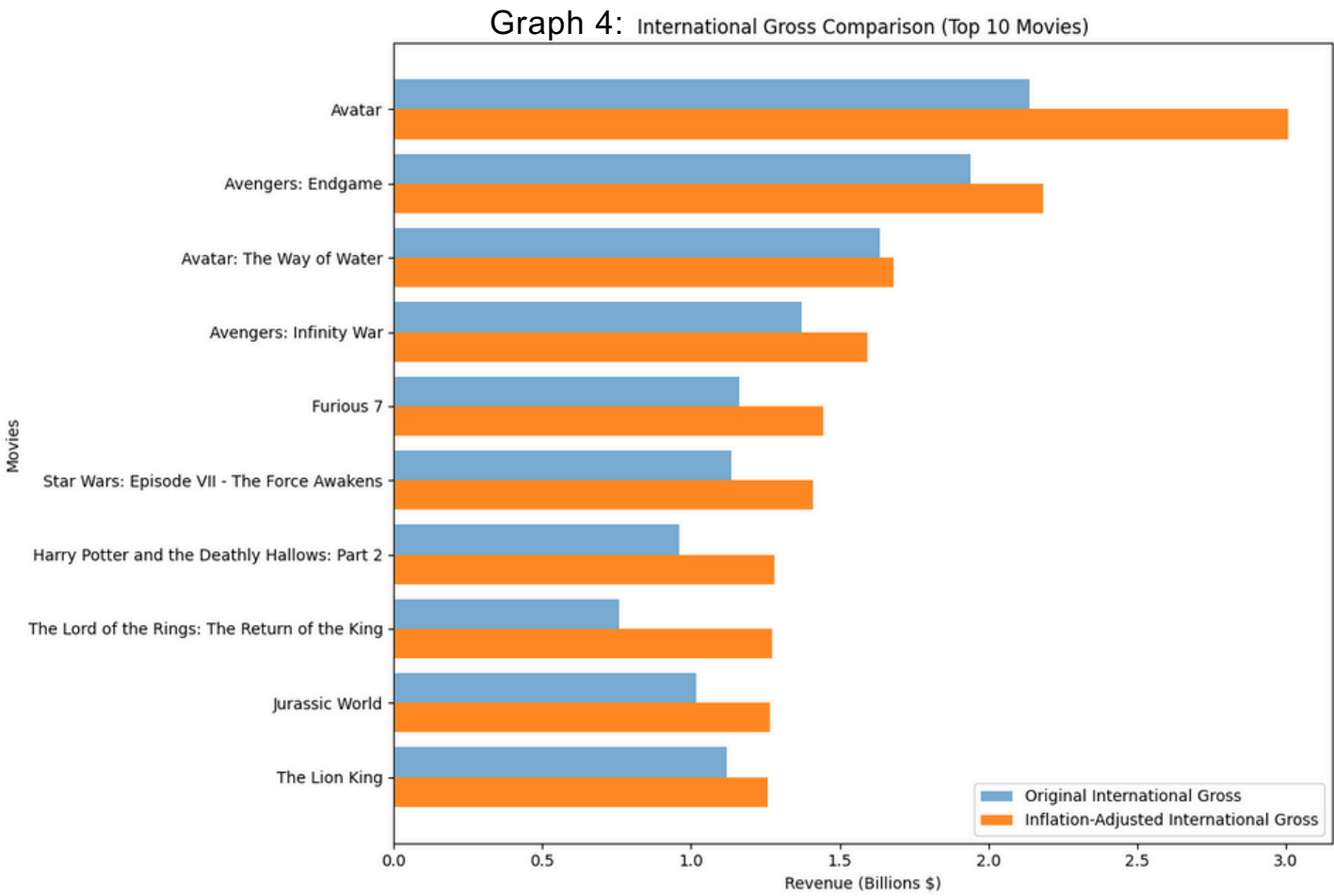
By aligning earnings to today's economic conditions, the comparison offers a more accurate perspective on the box office revenues of movies across different eras

Graph 5: Total Worldwide Revenue by Release Year

Graph 6: Inflation-Adjusted Total Worldwide Revenue by Release Year

CONCLUSION

THERE IS NOT A CLEAR RELATIONSHIP BETWEEN RATING AND REVENUES, BUT THE BIGGEST AMOUNTS OF REVENUES ARE LOCATED IN THE SECOND HALF OF THE RATING VALUES

THERE'S A CLEAR CORRELATION BETWEEN RENOWNED DIRECTORS AND HIGH REVENUE, INDICATING THAT DIRECTORS PLAY A CRITICAL ROLE IN COMMERCIAL SUCCESS.

BIBLIOGRAPHY

- K. Dodds (2006),"Popular geopolitics and audience dispositions: James Bond and the Internet Movie Database (IMDb)"
- A. Oghina et al. (2012), "Predicting IMDB Movie Ratings Using Social Media"
- N. Quader et al. (2017), "A machine learning approach to predict movie box-office success"
- Box Office Mojo. (n.d.). Retrieved January 23, 2025, from https://www.boxofficemojo.com/
- IMDb. (n.d.). Feature Films Released Between 2001-01-01 and 2023-12-31. Retrieved January 23, 2025, from https://www.imdb.com/search/title/?title_type=feature&release_date=2001-01-01,2023-12-31&num_votes=200,&genres=!documentary,!short&sort=num_votes,desc