



Data science Phase 1 Project

By Yannick MPOYI
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Part-Time class

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○ Project Overview

Microsoft sees all the big companies creating original video content and they want to get in on the fun. They have decided to create a new movie studio, but they don't know anything about creating movies.

We are charged with exploring what types of films are currently doing the best at the box office.

we must then translate those findings into actionable insights that the head of Microsoft's new movie studio can use to help decide what type of films to create.

○ Data source

The data sources used for this project are from the **Box Office Mojo** and the **Internet Movie Database** (IMDb) which is an online database containing information and statistics about movies, TV shows and video games as well as actors, directors and other film industry professionals.

Actually, we used three databases :

1. Two datasets extracted from the **Internet Movie Database** (IMDb) that are respectively based on the statistics on the moving ratings, votes for the titles, movie genres, etc. (imdb.title.ratings and imdb.title.basics). There are available online and refreshed daily on <https://www.imdb.com/interfaces/>
2. One dataset (bom.movie_gross) on statistics generated by the **Box Office Mojo**.
3. We collected addition information on the World's Richest Movie Studios from moviemarker.co.uk to help the directing board have a diversified view before landing on the movie industry.

○ Used Methods

We will go through all datasets by the usage of the exploratory data analysis method for this project.

Besides, it is import to mention that we mainly applied the documentary techniques in order to collect and prepare the targeted information.

○ Results

In order to provide insights and enforce the company penetration market strategies in the movie industry, our results will focus on the following strategic orientations:

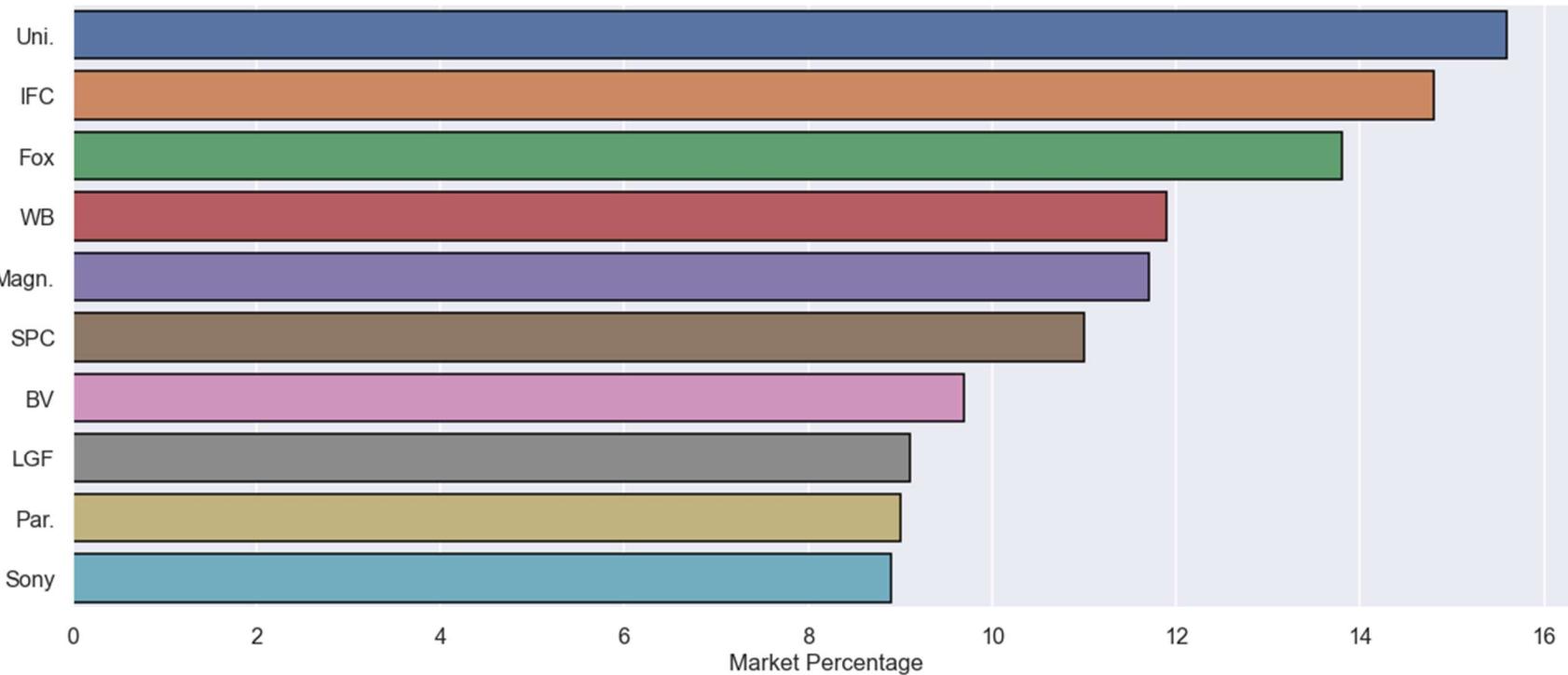
- Top 10 competitors in the market (Top highest movie studios)
- The most profitable(Domestic, International and worldwide) movie studio per genre.
- The current movie market trend by average rating, genre, etc.
- Determinant of a high rating or gross movie.
- The movie genre that the company should target in the first starting year.

0. Identifying The World's Richest Movie Studios

Item	Studios	Insights
1	Sony Pictures	<ul style="list-style-type: none"> • Sony's global wealth is huge, with its interests in technology and video games bringing in huge revenues, but it's cinematic arm – Sony Pictures – also brings in huge numbers at the box office. • In 2019, it grossed well over \$1.3billion from a number of big releases. While Sony released 24 movies that year, Spider-Man: Far From Home and Jumanji: The Next Level bought in over half of that between them.
2	Universal Studios	<ul style="list-style-type: none"> • Universal remains the highest-grossing movie studio of all time, bringing in some \$43billion since it began releasing films in 1913(!). • According to Deadline, in 2018 Universal Studios was the third-highest grossing studio in Hollywood, bringing in a reported \$4.82billion that year from domestic and worldwide box-office. • This represented around a 9% market share of all the money made from film that year. However in 2019 this dropped to around \$3.62billion which was largely down to one of it's biggest competitors taking control of the global box-office.
3	Warner Bros	<ul style="list-style-type: none"> • Warner Bros. have a history of performing well at the box office, especially in recent years. They became the second-highest earning studio in 2019 with impressive takings from films such as Joker (\$333m) IT: Chapter Two (\$211m) and Pokemon: Detective Pikachu, Shazam and Aquaman (\$415m collectively) helping them bring in well over \$1.5billion. • They had hoped to be one of the strongest performers in 2020 despite the pandemic, though Tenet, lauded as the savior of cinema, faltered somewhat by bringing in just \$57m
4	Walt Disney	<ul style="list-style-type: none"> • All other studios look tiny compared to the global powerhouse that is the Walt Disney company. It's strategy of acquiring other studios such as Marvel and 20th Century Fox (RIP) in multi-billion dollar takeovers has yielded huge annual takings that began to dwarf it's competition. • Despite releasing significantly less movies per year than the other studios – Walt Disney have been literally raking it in – making more in 2019 than both Warner Bros. and Universal combined with an incredible \$3.7billion. This was thanks to its huge tentpole franchises such as Avengers and Star Wars. In fact since buying Marvel Studios for \$8billion in 2019, Disney has made \$28billion from that property alone. • It's also likely that Disney would have taken over as the highest-grossing studio of all time had 2020 been the year they had planned.

Source : <https://moviemarker.co.uk/the-worlds-richest-movie-studios/>

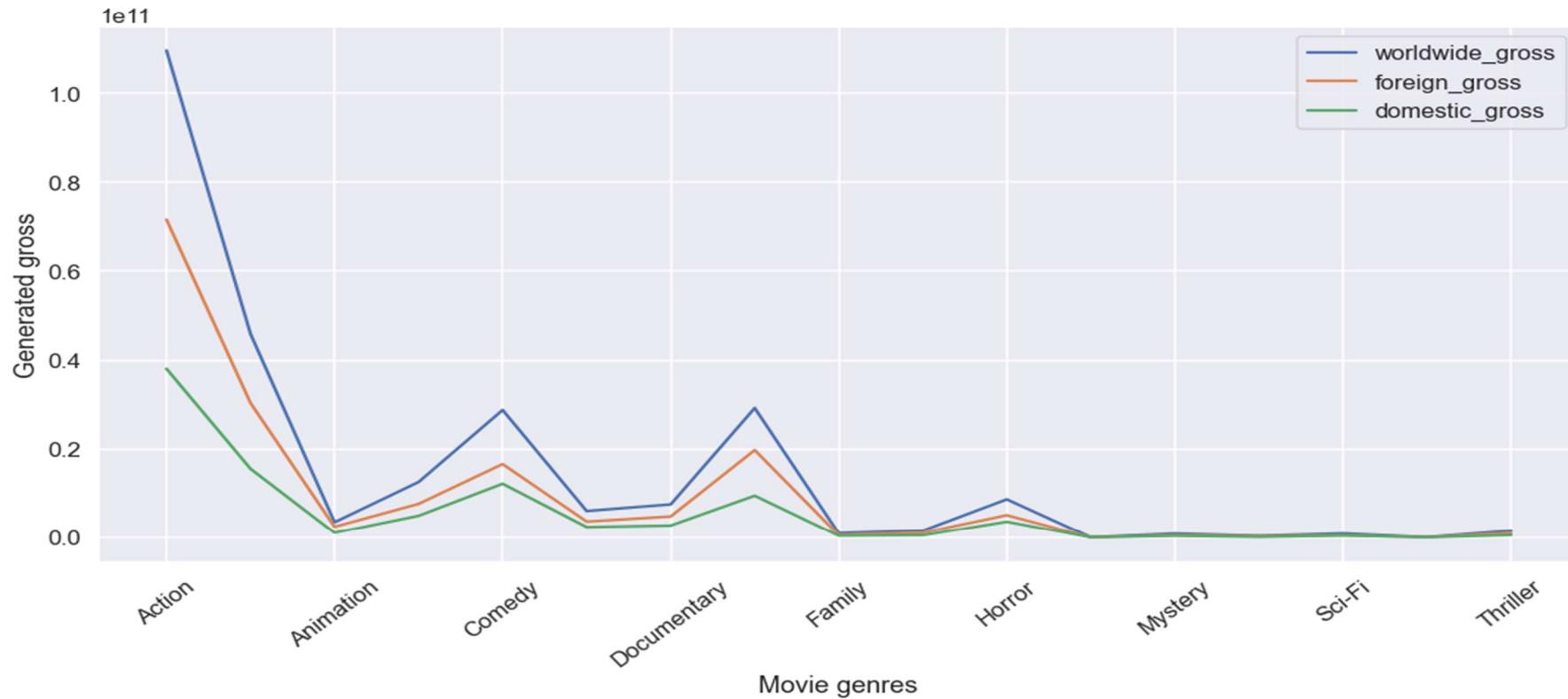
Fig 1: Top 10 highest competitors in the market



This visualization perfectly responds to our business concern. In fact, it displays the market share with top 10 highest movie studios (competitors) from Universal to Sony.

The market battle is extremely tight even though Universal, IFC and Fox are leading the race with scores more than 12,8% of the share.

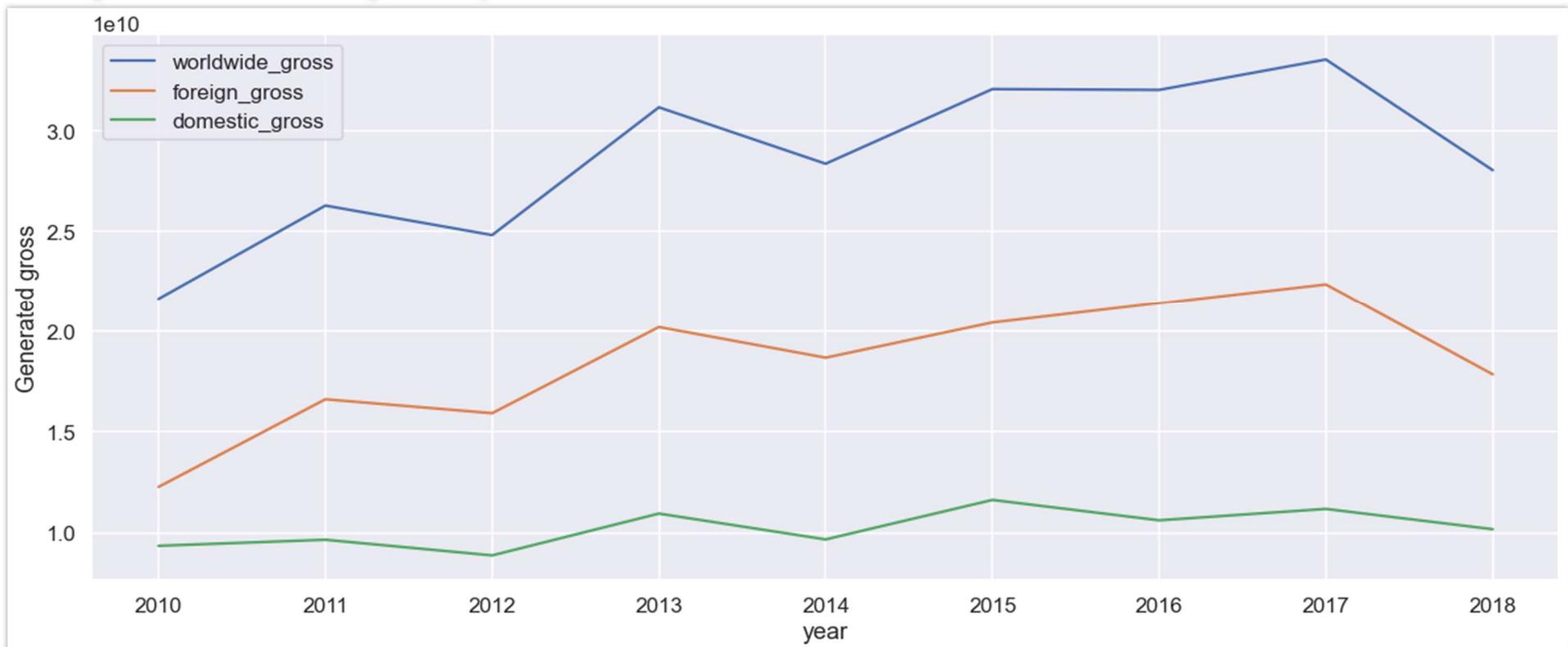
Fig 2: The box office per movie genre ('worldwide_gross', 'foreign_gross', 'domestic_gross')



From the visualization above, we can conclude that the Action movies, comedy and documentary are respectively the most profitable in the national market as well as in the international one. Action movies are extremely the most successful in all markets.

It is important to mention that the foreign market is more profitable than the domestic one in any movie category.

Fig 3: The box office throughout the years

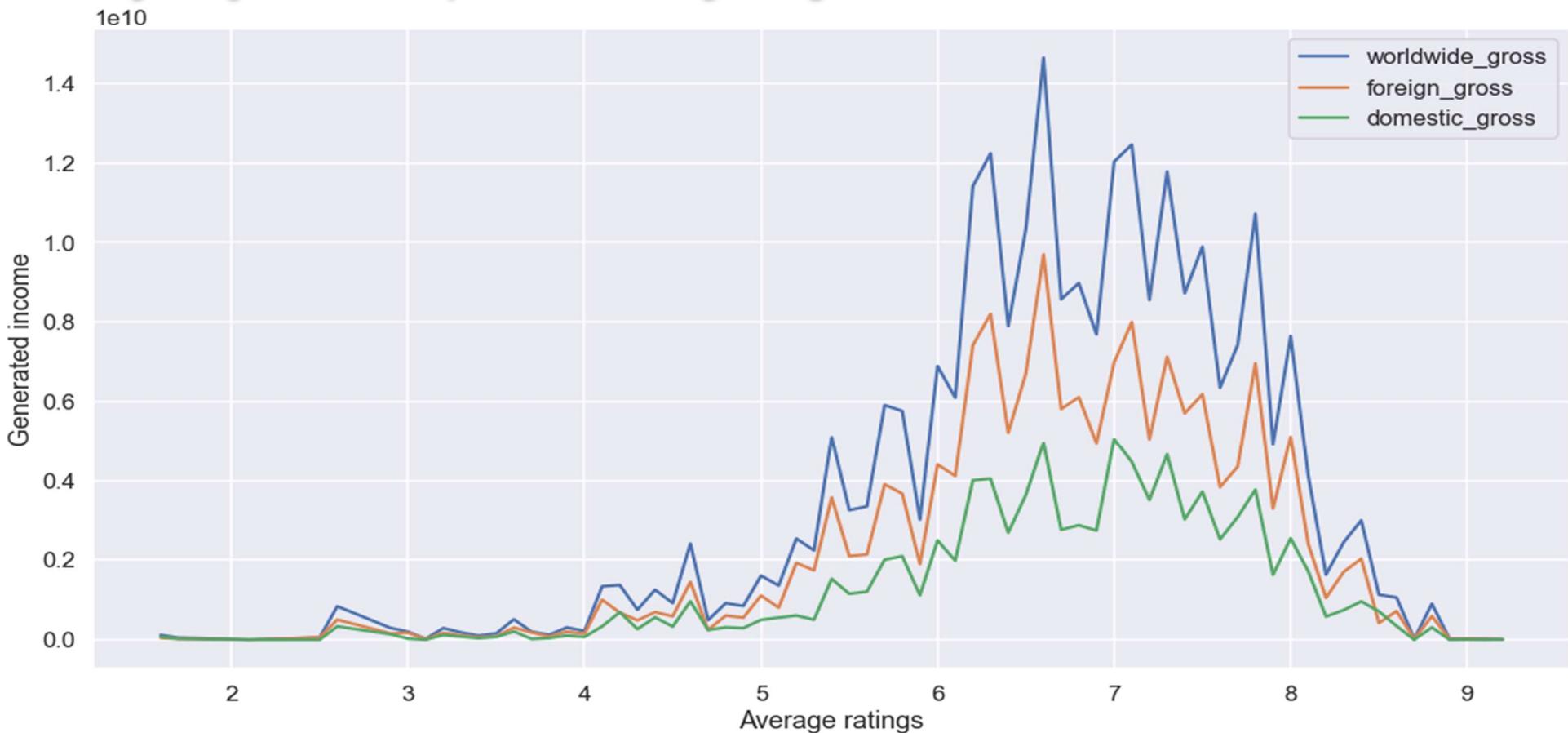


We can clearly observe the positive evolution, from 2010 to 2017 of the gross incomes for both national and international markets. And the foreign box office is widely higher than the domestic gross income every year.

The year 2018 is qualified as a decline point that started by the beginning of 2017. Otherwise, the movie studios have seen the gross incomes decline in all markets from 2017 to 2018.

Comparing to the domestic gross income, the decline was more drastic for the foreign gross income. As long as the worldwide gross is the total amount of both domestic and foreign gross income, It is natural to notice that it has the highest counts throughout the years.

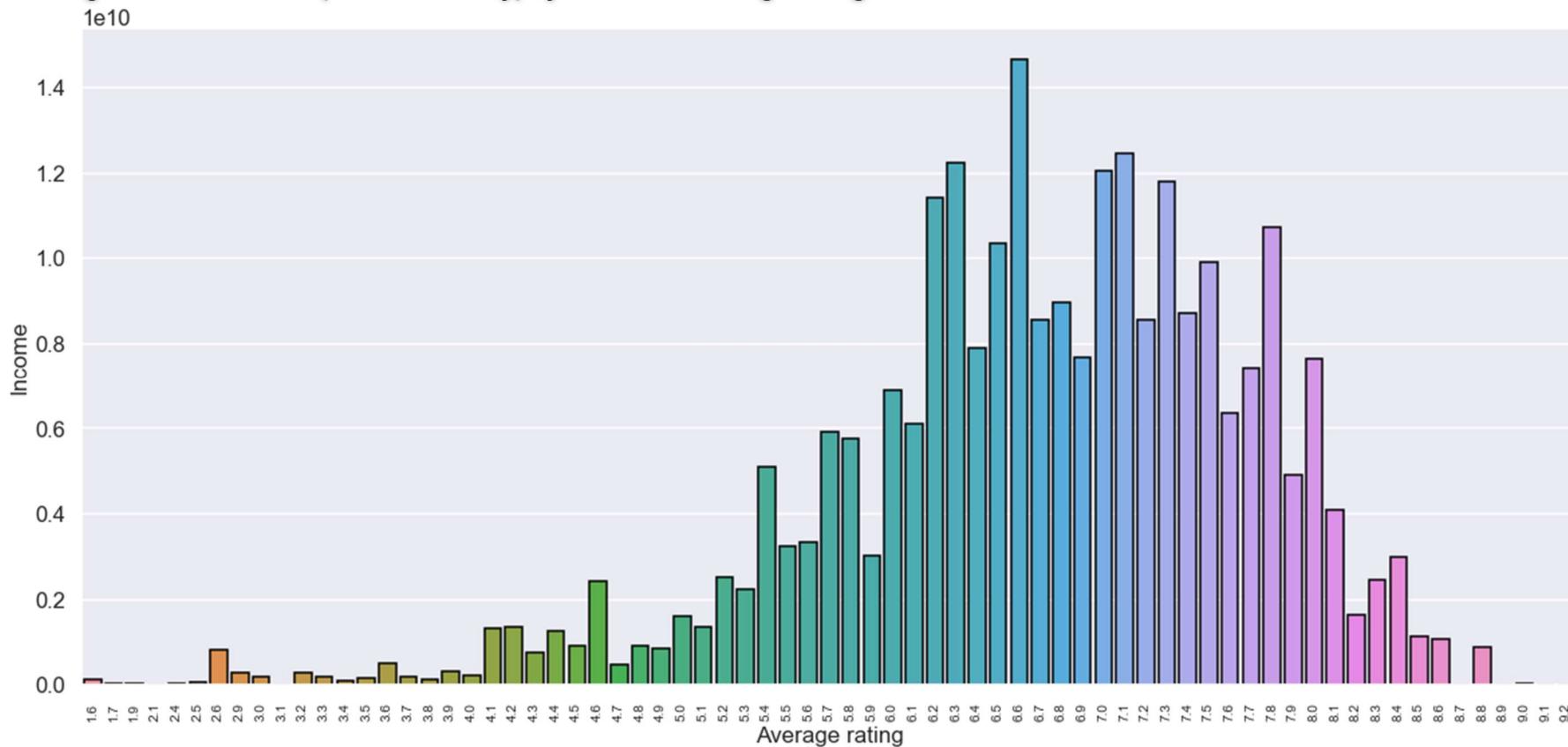
Fig 4: The gross incomes by the movie average ratings



We can clearly notice the proportionality of worldwide, foreign and domestic gross income respectively based on the average ratings. Most of high gross income movies are on average ratings of 6.0, 7.0 and 8.0.

Note: The business is quite more important outside of the country.

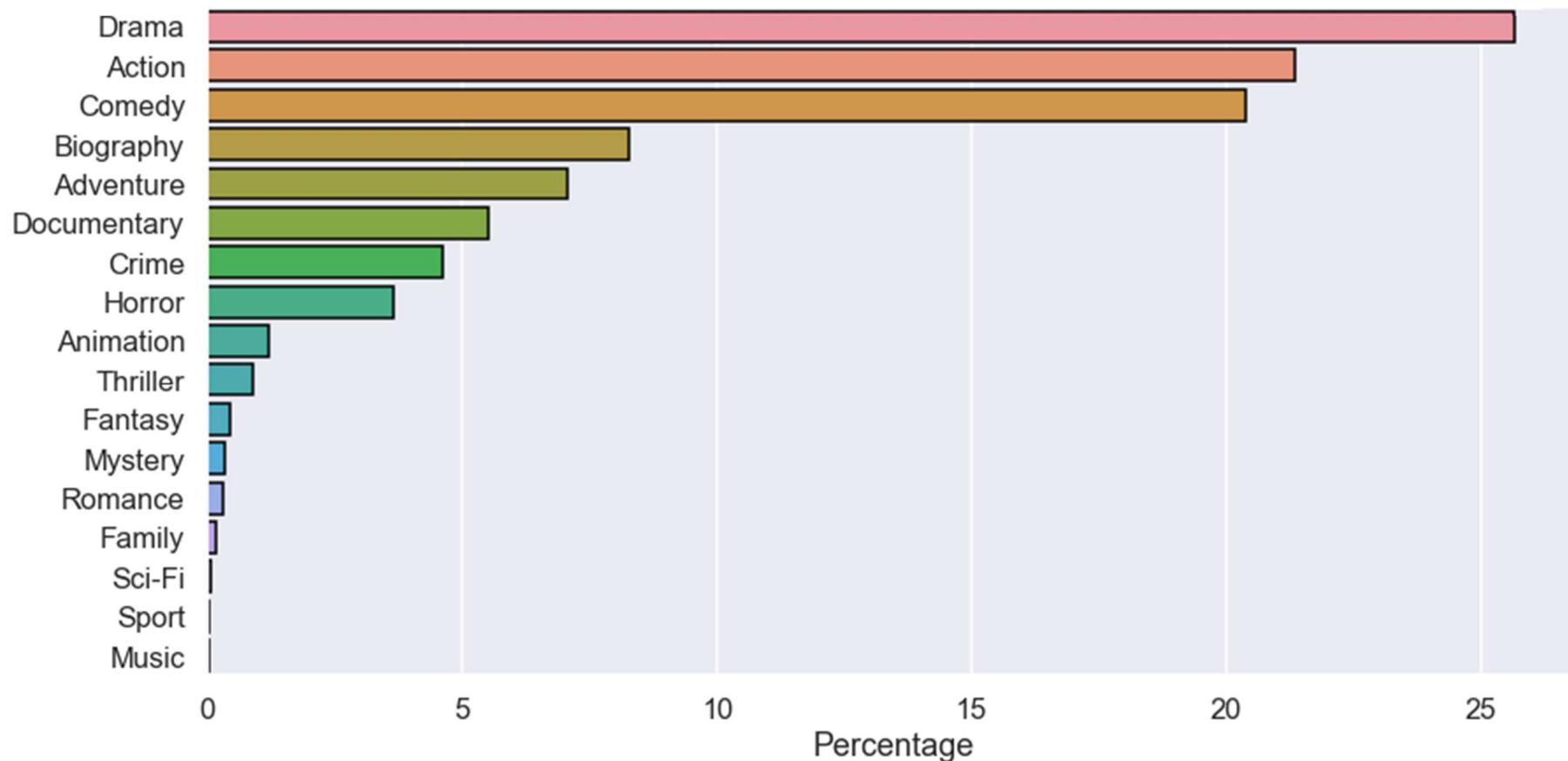
Fig 5: Gross income (Worldwide only) by the movie average ratings



At first sight, this distribution tends to be normally distributed. Besides, we can conclude that the most successful movies at the worldwide box office are generally rated on the average from 6.0 to 8.0 ratings. Range that contains more than 70% of the gross income for both foreign and domestic.

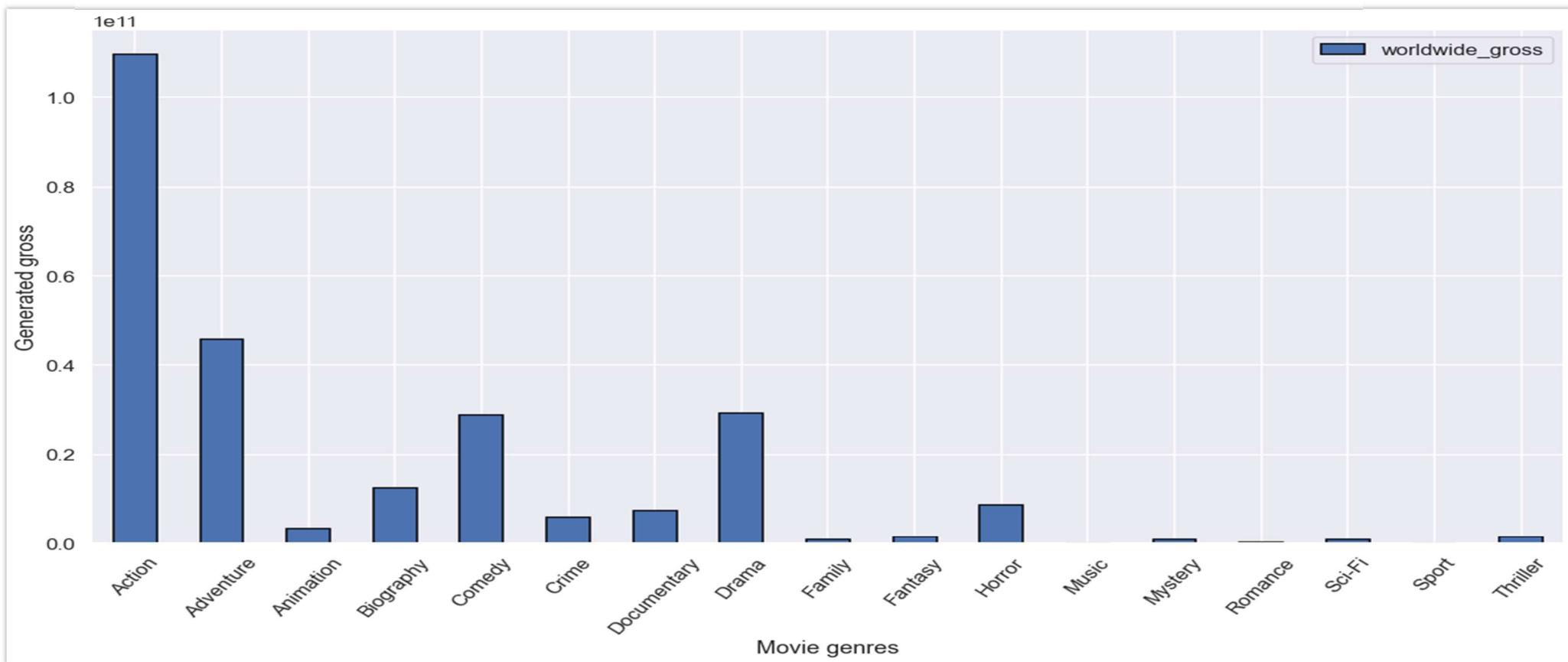
It is important to point out that the 6.6 rating represents the peak of the box office income.

Fig 6: The market share by the movie genres



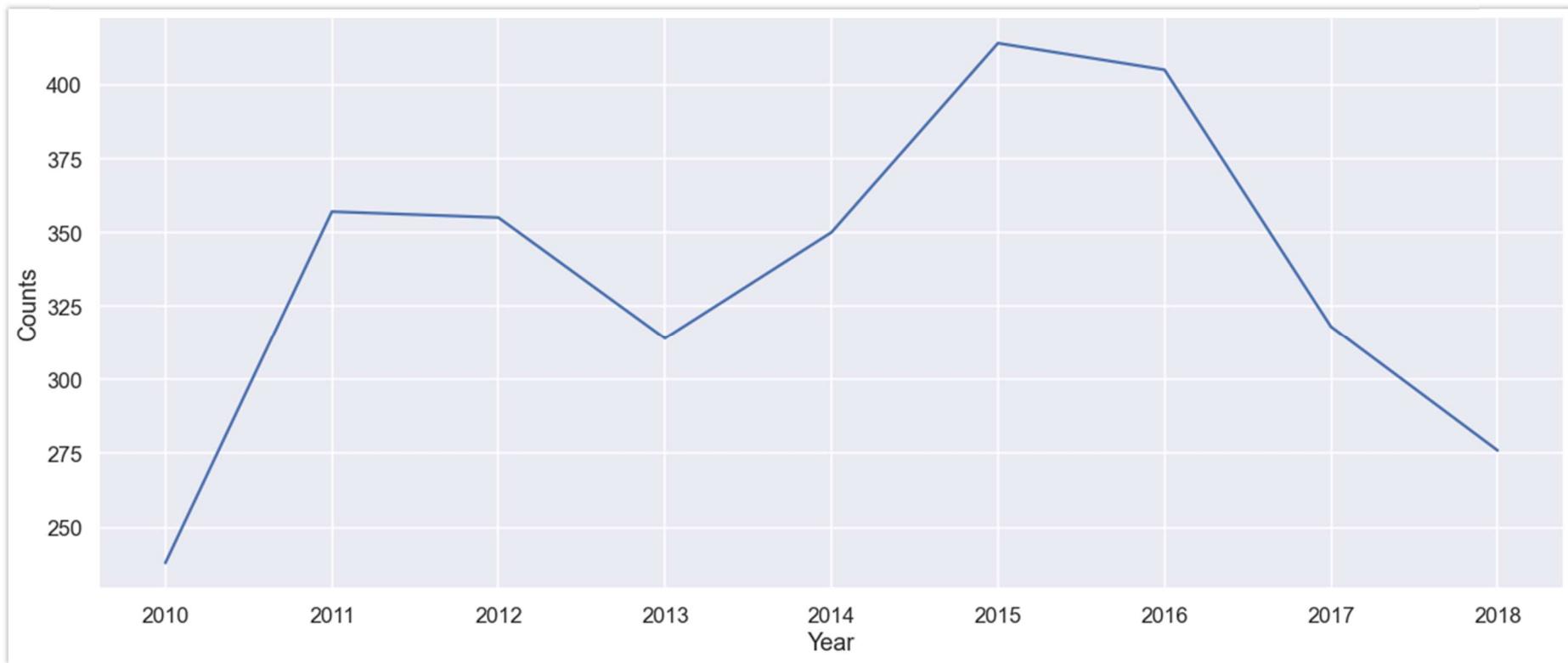
It is clear that the number of the movie production is mostly dominated by Drama, action and comedy movie genres. These categories have already passed the score of 20%

Fig 7: The world wide box office per movie genres



As mentioned earlier, the action movie genre is an extreme profitable product. It has generated the highest gross income for the total (domestic and foreign) or worldwide market. The following profitable movie genres are respectively Adventure, Drama and comedy.

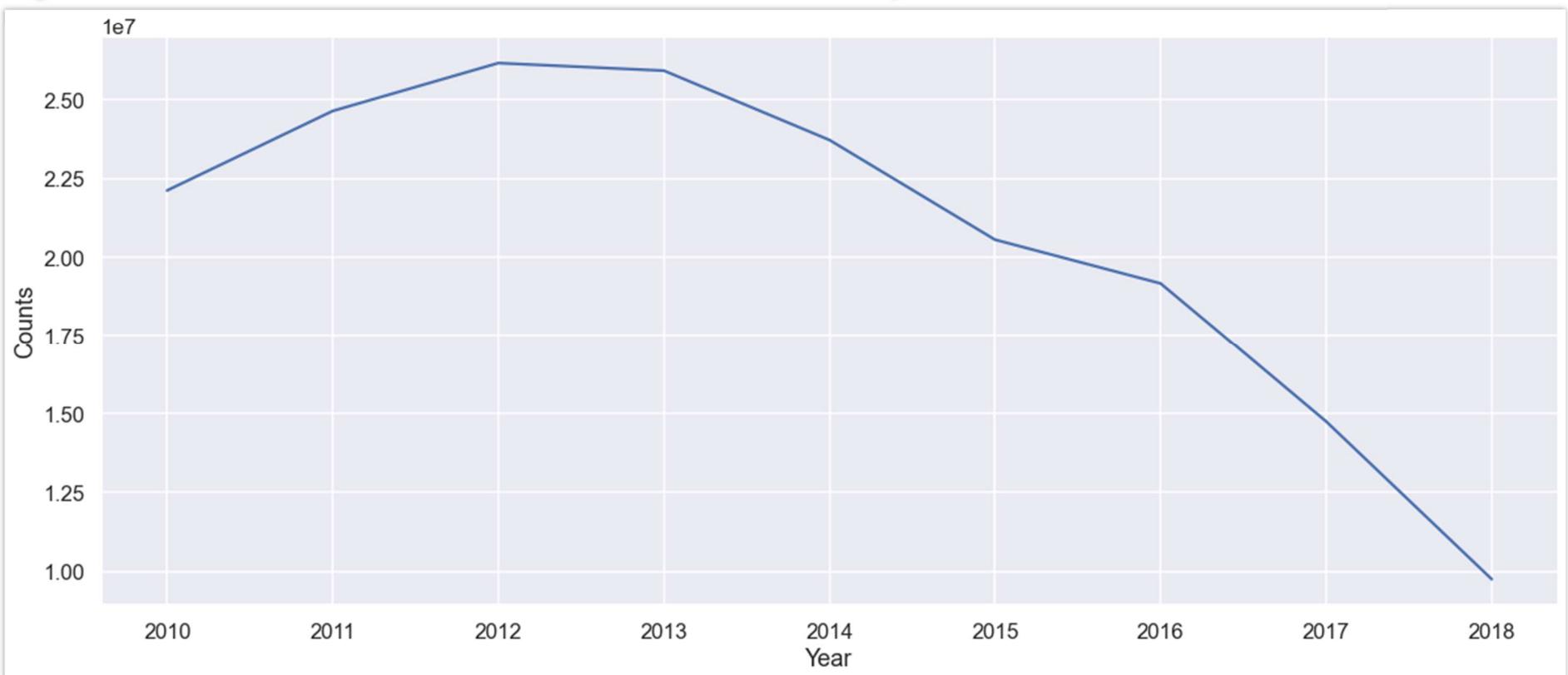
Fig 8: Evolution of the number of movies over the years



This statistical distribution seems cyclical despite the breaking points observed in 2017 and exceptionally slid till 2018.

The year 2015 was a golden period that performed a record of the movies number. This success slightly occurred in 2016. Unfortunately, there has been a considerable drop-off of 32% of the produced movies from the year 2016 to 2018.

Fig 9: The number of votes received for the movie title over the years



The pattern found in this visualization defines the number of votes the movie title has received. In fact, the stated number started to positively increase from 2010 to 2012 (from 22112170 to 26166379 votes). Almost a slight stagnation was observed from 2012 to 2013. Unfortunately, the trend drastically started to decline from 2013 up to 2018 (from 25,924,976 to 9,756,135 votes :an extreme drop-off of 62.4% of votes).

○ Conclusion and Recommendations

The aim of this exploratory business data analysis was to deliver actionable insights to the company directing board for efficient decision-making on the movie studio creation.

- The foreign market is more profitable than the domestic one in any movie category throughout the years. Therefore, we recommend Microsoft to more stress the movie investment in the foreign market. This can help diversify its portfolios, hedge against risk and tap into growth in economies beyond your own.
- It was important to segment revenue by movie genre in order to determine which movie categories (genre) should Microsoft start investing on. Therefore, the action movie category is an extreme profitable product. It has generated the highest gross income for the total for both domestic and foreign market. The following profitable movie genres are respectively Adventure, Drama and comedy. we highly recommend the company to focus their production on these four categories.
- Top highest movie studios in the industry have been identified respectively in this order:

Top highest movie studios				
1. Universal	2. IFC Films	3. Fox	4. Warner Bros	5. Magn
6. SPC	7. BV	8. LGF	9. Paramount	10. Sony

We strongly recommend Microsoft to keep track those competitors on a daily basis and potentially build relationship with them. Collaborating with competitors has higher probabilities to get access to data, analytics, trends, and new resources that will be mutually beneficial. Working together can help identify new sales opportunities, promote cross-selling, coordinate marketing promotions or/and promote the company in this movie industry.

The yearly number of movie seems cyclical, with an average of 336 movies produced, despite the breaking points observed in 2017 and exceptionally slid of 32% in 2018. The same year recorded an extreme drop-off 62.4% of the votes the movie titles has received. Besides, the worldwide (proportional to domestic and foreign) movie gross earnings declined extremely in the same years (from 2017 to 2018).

Consequently, we recommend further the statistical analysis (casual, explanatory and/or prescriptive, etc.) in order to determine the causes and effects of this situation or determine optimal course of the investment by considering all relevant factors. Besides, incorporating qualitative information into regression analysis through dummy indicator variables will bring more apprehension.

In fact, we would like to know :

- ❖ What cause the foreign box office earnings to be always higher than the domestic box office
- ❖ Determinant factors of an average rating on the maximal gross movie income
- ❖ Market/ gross income predictions (foreign and domestic)
- ❖ Etc.