

Domestic Film Box Office Analysis Review

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Abstract— In 2019, the domestic box office expected to ring up close to \$11.4 billion, down 4% from 2018, \$11.88 billion. Affected by the COVID-19 pandemic, the domestic box office will likely continue to decline in 2020. In this context, the study of the film market becomes more important. By understanding audience preferences and market trends, film production and distribution companies can make adjustments to cope with the shrinking market. This article reviews and summarizes some articles on market analysis and sentiment analysis and propose some expectations for the future research of the film market analysis.

Keywords—Market Analysis; Film; Box Office; Web 2.0; Sentiment Analysis;

I. INTRODUCTION

The domestic film market in the United States is currently facing impacts from various competitors. On the one hand, the impacts of Open video platforms are continuous and significant. Platforms such as YouTube provide people with various types of video content, occupying users' time. On the other hand, in recent years, the raised of streaming content providers is a bigger threaten. Streaming content providers such as Hulu and Netflix provide users with a large number of TV series and movies online, there is no time limit for them to access these contents; users can watch any content anytime, anywhere.

This impact is directly reflected in the total box office of films. The total domestic box office of films in the United States in 2019 was \$11,320,883,903.00, down of 4.80% from 2018. The growth speed of the box office from 2010 to 2019 is significantly slower than the speed from 2000 to 2009. In the context of the slowdown in market development, conduct a more comprehensive research about this industry is necessary.

Market analysis is an important part of business analysis. It is one of the core applications of business intelligence and analysis systems. As Wil Van der Aalst's book shows, business is becoming more and more data-driven [1]. Data help film studios and distributors build a better understanding of the market and users. It would optimize their decision-making. Sufficient market analysis and research can provide a more reliable basis for business decisions.

The film industry combined technological advances with innovative content [2]. It brings huge potential economic benefit to this industry. The huge economic benefit is the driving force behind the development of the film industry, the box office is the most direct reflection. However, high benefit comes with high risk, the film industry is also a high-risk industry, the huge sunk costs in film production and marketing are significant, the uncertainty of the audience's preferences further expands the risk.

In the context of slowing or even shrinking market development, choosing a more stable investment will be a more reasonable choice, and market analysis will provide decision-makers with great help in this process.

Market analysis involves multiple disciplines, including but not only economics, statistics, psychology, and sociology. For different fields and businesses, the appropriate market analysis methods are also different. Only by collecting and proper data and choosing appropriate analysis methods can we obtain credible results. In this article, we will discuss and summarize the market research conducted by previous researchers in the film market. On the one hand, these studies provide support for our future research. On the other hand, we will point out the deficiencies in these studies, and the direction of research that would able to make up for these deficiencies.

In the past, film marketing mainly relied on billboards and TV commercials. Tripartite evaluations of films usually come from film critics. The angle of film critics' evaluation of films is usually from a professional perspective, focusing on the artistic and emotional expression of films. For most people, such film reviews do not provide a good reference for them to choose a film. Since social media has provided a platform for ordinary viewers to express their opinions, many users' choices may be influenced by the views and emotions of other users in social media. This is one of the important application scenarios of Marketing Intelligence 2.0. We have reason to believe that users' choice of movies will also be affected by sentiment from social media. Therefore, in this article, we will also discuss the significance of sentiment analysis in social networks to the analysis of the film market.

In summary, this article will discuss the market analysis of the film market. The discussion will be focus on:

1. The previous research on the film market analysis, their conclusions and deficiencies.
2. The significance and role of sentiment analysis in business intelligence / marketing intelligence. This technical background, significance, and actual effect.

II. LITERATURE REVIEW

A. Film Market Analysis

In this part, we will discuss several film market analyses conducted by researchers. Aim to have a basic understanding of the overall film market in the US. These analyses can help us understand how the domestic film market performance recently and also the tendency of its future development. The analyses will include both content for the film production industry and the film distribution industry. As two important parts of the film industry, they share some common but also have significant differences in development.

From 1975 to 2019, the overall box office in the domestic market of the US increased from \$0.44 billion to \$11.07 billion in 2019. However, with the flourish of the whole industry, the competition also become fiercer and fiercer. The average gross of films is not as optimistic. It has a great decrease from 1975 to 1980, and then keep decrease until now. Fierce market competition is one part of the story, in recent years, the rise of stream content provider makes the market competition even worse. Streaming services, like Netflix and Hulu, have fundamentally changed how consumers watch TV and movies. It is true that if audiences are spending more time watching content at home, they are spending less time at theaters.

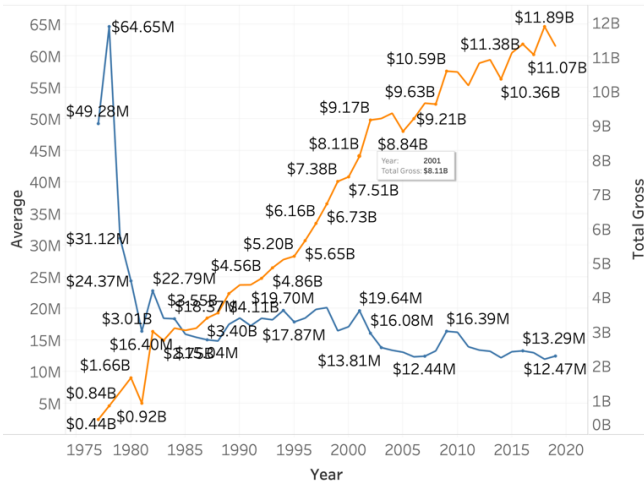


Fig 1 Domestic Film Market Gross Tendency

Both the production industry and distribution industry affected by it. Based on the report from IBIS World, the movie and video production industry has grown moderately over the five years to 2019, benefiting from steady demand for entertainment [16]. Meanwhile, the overall revenue growth in the domestic film production industry is growing slowly, the revenue has increased by only 2.4% to \$32.9 billion over the five years to 2019. This report believes that the growth rate of industry revenue will keep decrease, they

predict the annualized growth rate will slow down to 2.0% in 2024. What makes the market prediction more pessimism is, the report ascribes the growth of industry revenue on higher ticket prices rather than increased attendance.

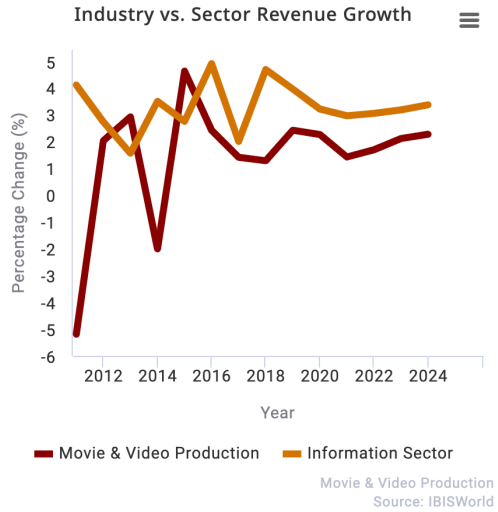


Fig 2 US Film Industry Growth Rate Tendency & Prediction

The situation of production market even worse. Based on the report, the movie and video distribution industry revenue declined 1.7% to \$1.6 billion over the five years to 2019 [16]. They predict that the annual growth of movie and video distribution market in the US will keep decreasing, the annual growth rate will decrease by 4.6% between 2019-2024. The shrinking of the film market is caused by both short-term and long-term reasons.

2020 could be a worse year for the film industry. With the threat of COVID-19, the theater has taken many actions [7], it will unavoidable causes loss to them. Some movie theaters have been shut down to prevent the spread of disease and reduce the loss of low attendance. AMC, the biggest movie exhibition company in the US and Europe, closed all of its cinema in the US, approximately 600 in total [8]. The theater gross all around the world expect been greatly affected in the second quarter.

The distribution market continues to suffer from external competition as digital technology enables production studios to distribute their own content and bypass industry operators. The development of streaming services has a great impact on the traditional film distribution market. It is true that the popularity of streaming services is affecting the traditional movie theater industry. With the development of streaming services and digital platforms, customers are able to enjoy the various media contents online at their own homes with more freedom and less costs. In addition, most streaming service providers has been utilizing the advantages of data analysis to improve their services and expand their market. For example, Netflix is utilizing the recommendation system based on the profile of the viewers and users' preferred choices to accurately release personalized services and recommend to users what they may like. Their website or platform is learning and becoming more intelligent. Because of this, users will have an easier time finding a film under the

preferred genre that they might have missed during its run in the cinemas.

In general, the shrinking of the film market will reduce the overall market revenue. Most film distribution companies' conservative application of market technology makes their marketing strategy less effective. In addition, the external competition from streaming media is also very fierce. The attraction of streaming media service providers to users will shrink the traditional movie market. Many film companies are aware of this problem and begin to use their own content and copyright advantages to promote their own streaming services, such as Disney + launched by Disney. However, we must realize that this will further intensify market competition [16].

B. Sentiment Analysis

1) *The Significance of sentiment analysis:* After the bursting of the Internet bubble in 2001, people have more thinking and different understandings of the development and future of the Internet. People began to learn the lessons by studying the difference between those companies that disappeared after the bubble burst and those that survived. At the same time, people began to explore the future direction of Internet companies.

In these discussions, O'Reilly's definition of the new era Internet form has been proposed, and it has since become the basis for the definition of Web 2.0 [4]. Web2.0 has complex components and definition. The development of technology makes the range of Web 2.0 is constantly changing, let the thing to be more complex. But no matter what changes occur in the technical environment, the core features of Web 2.0 are [4]:

- 1) Platform
- 2) Social wisdom
- 3) Data driven

With the development of web2.0, social networks have gradually become an important part of people's lives. Platforms such as Twitter and Facebook have become platforms that we cannot ignore [5]. Users are highly involved in the generation, dissemination, and discussion of the content in these platforms. Just as Web 1.0 developed a huge market, Web 2.0 also exploit a brand-new consumer market. The high degree of user involvement and the effect of the long tail theory combine together, exploit a market that was neglected, or better to say a market unable to exploit in the past [6]. "Endless choice is also creating unlimited demand" [7], Web 2.0 brings a huge new market for both buyer and seller. However, in these open social platforms, many traditional data mining and data analysis methods have no longer to work. New methods and new tools are needed to deal with these new data in the new era.

In order to exploit the value of data, to better store, manage, analyze and visualize data, more and more companies use business intelligence and analysis systems (BI&A) to manage data from inside and outside of the company. In order to exploit the value of data, to better store,

manage, analyze and visualize data, more and more companies use business intelligence and analysis systems (BI&A) to manage data from inside and outside of the company. However, the BI&A 1.0 system has been unable to handle the unstructured big data generated by users in the context of web 2.0. In response to this situation, the evolution of BI&A 2.0 is mainly focus on the processing of web-based unstructured text data [8].

In this context, Social media analytics and opinion analysis (sentiment analysis) have become the core applications of will BI&A 2.0. They help companies better understand the market, understand users, and understand the factors that affect user decisions.

2) *The application of Sentiment analysis:* some previous studies have discussed the application of sentiment analysis. Nasukawa et al. Propose a method to polarity specific subjects from the document into categories of positive or negative, instead of classifying the whole document [12]. The analysis methods based on this theory to quantify text content are still widely using. Quantify through sentence parse and vocabulary polarization. A large part of the discussion focused on the analysis of Twitter data [9][10][11]. This is because Twitter has a rich user-generated content while providing a convenient API for researchers and developers to use.

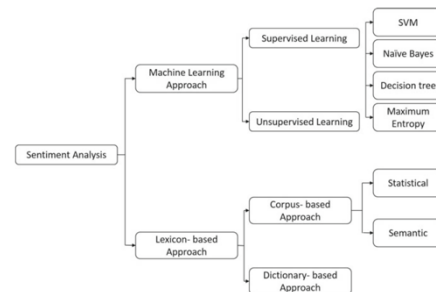


Fig 3. The main techniques used in sentiment analysis

Agarwal et al. conducted experiments using data from Twitter and found out the most critical features for these models. After compare with data from other data sources, as a result, the authors believe that the data from Twitter is not significantly different from other data sources in sentiment analysis [9]. Kumar et al. used Twitter API tools to build a real-time Twitter comment scoring system, then build their model based on corpus, dictionary and a scoring algorithm they proposed [10]. The method they proposed can linearly quantify the intensity of feelings. Let the comparison of comments easier and more precise.

People use hypertext mix pure text and emoji all the time. Researchers also have research on this hypertext content. For example, researchers from Twitter have proposed a patent that uses emoji analysis in text to predict sentiment.

There are also some works have done specialize in discussing the sentiment analysis for movie reviews. Thet et al. used the corpus and dictionary to conduct text analyze, what different to previous researches is, their datasets specify on directors, actors, stories, scenes, and music comments,

they respectively get a 75%, 86%, 83%, 80%, 90% and 81% prediction accuracy rate of each dataset [14].

Manek et al. used the SVM method to conduct feature classification for some different sentiment polarity data. Compare with the Naïve Bayes method, their model gets a better result in some movie review datasets.

3) *A summary for sentiment analysis*: sentiment analysis is an important part of the BI&A system and market intelligence system, researchers have done some work in this area of study, its development will accelerate with the development of NLP.

III. ANALYSIS AND RECOMMENDATIONS

A. *Opinion and Future of Film Industry market Analysis*

In the previous section, we have established a preliminary understanding of the market analysis for the film industry. Especially in response to the rise of streaming content providers in recent years, we learned about their impact on traditional film production and distributors, and also how the traditional companies have begun to build their own service and compete with these new players.

Generally speaking, these reports can reflect the overall market trends, such as market growth rate and cyclical fluctuations. It is very important for us to understand the future development trend of the market from a macro perspective. However, for each specific project or enterprise, this level of analysis may not be able to help decision makers to make an actual decision.

On the one hand, more detailed analysis could help people better understand the market and that information will be more useful. For example, analysis the further subdivided film genre could illustrate the profit difference and market distribution between films of different genres, which will help companies in their decision-making.

On the other hand, the unilateral analysis report from the market may ignore the user's opinion. The current market report is based on an enterprise-based information system, and the statistical data and change trends we obtain are based on the information collected by the companies. In this system, the user's opinion is reflected indirectly, it is reflected in the statistical data in the form of a box office or the number of audiences. Obviously, it will cause a lot of valid information to be filtered in this process. Build an analysis system that can directly gain information from the user, which method may help the companies have a better understanding of the user. Also, information directly from the user will contain more information, the companies may be able to extract new ideas and make a break in the traditional market, create a new market that has less competition.

B. *Opinion and Future of Sentiment Analysis*

In the previous section, we have mentioned the value, meaning, and development of sentiment analysis. We have also summarized the researches from some other researchers have done in this area. These introductions will be very

helpful for us to build a brief understanding of sentiment analysis.

However, technology is an aspect of business information systems, and practical application is another important part, which determines the actual value of business information systems.

In the process of collecting literature, we found that although researchers are actively exploring sentiment analysis and prediction methods for different data, no matter they are from twitter, movie review dataset, IMDb, or any other resources, few researches mention the real-world meaning of these researches. How can these methods and prediction work in the real-world content? Based on this issue, we propose two questions about sentiment analysis here:

- 1) Does this prediction have practical significance?
- 2) If the result of this prediction is significant, to what extent can these sentiment analyses assist companies in making decisions?

The answer to the first question will determine whether sentiment analysis has practical significance for the film industry. For example, can data from Twitter help predict box office development trends? We all know that the daily box office of released movies will fluctuate in a cycle of 7 days. If the answer to question one is positive, comments from Twitter may help predict box office data for the next week. Another example is whether there is a difference between professional movie critics and Twitter comments, which one can more accurately predict the actual audience choice. We may be able to answer these questions since we prove question one.

When the market is shrinking and competition is intensifying, every successful decision will help the company's development, and every wrong decision may lead to a disaster of the company. In the film industry, one failure investment causes the failure of the whole company is not a rare story. So, if sentiment analysis may help companies find a better investment direction, it will be a very meaningful application.

Sentiment analysis can help companies better understand users' ideas. Therefore, a comparative analysis of the sentiment of different types of movie reviews may help us find movie themes and genres that are more popular with viewers and increase the chance of successful investment. The questions that these analyses may answer will contain, are the viewers bored with a certain type of movie? Will the audience's overall evaluation of a certain type of movie affect

IV. CONCLUSION

This article mainly summarizes and reviews the content of two aspects. On the one hand, it is an analysis of the film market, market developments in the past few years and future trends. By summarizing some market analysis reports, it is found that most researchers and industry insiders believe that the reduction in market demand and the impact of external emerging competitor are the main factors of development slowness. In response to these problems, some traditional

film companies have also begun to start their own streaming service to adapt to the situation and compete with the competitors. For example, Disney launched Disney+, using their content and copyright advantages to compete.

These reports provide a lot of effective information to help people establish a basic understanding of the market. However, they also have some inherent problems. We point out these problems in this article.

Macro market reports help people understand the market, but it may not that helpful in assist an actual decision-making, which is necessary for the study of more detailed market segments. In addition, the traditional market analysis report relies too much on statistical information from the companies, lacks user opinions, they ignore the user's real thoughts, and filters out too much valid information. Establish business analysis systems that can effectively obtain user opinions and pay more attention to extract information directly from user opinions and behaviors, this will be the future trend. It is also one of the most advantages that emerging streaming content providers have, and the reason why they can quickly attract a large number of users.

The other part of this article focuses on business intelligence in the context of Web 2.0. Mainly focus on the significance, role, and research progress of sentiment analysis.

Through some earlier research, we sorted out the reasons for the emergence of Web2.0 and why BI&A 1.0 can no longer process the data generated in Web 2.0. These introductions lead to a discussion of sentiment analysis. By summarizing the research results of some studies on sentiment analysis, we established a preliminary understanding of it. Including data sources, basic research methods, basic algorithms, and possible application scenarios. These studies helped us understand the application scenarios and development of sentiment analysis.

Similarly, we raised some questions about these studies. For example, these studies are focused on theoretical research, their modeling and testing based on existing data sets. The actual application effect and the effect of dealing with more complicated situations are not explained. We believe that the next step of research can apply some experimental models to actual analysis, test their effects, and discuss whether these emotion analysis models do help people conduct user research and market analysis.

This article gives a brief summary and discussion of the film market analysis and sentiment analysis metals in market analysis and proposes some possible research directions. Hope to provide some reference for related research.

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