The Past, Present and Future of the Walt Disney's Revenue

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Abstract: Based on the 2012~2020 revenue data in the Walt Disney Company's annual report, the company's revenue gray GM (1, 1) model was constructed, focusing on the analysis of revenue in 2020. The analysis shows that the growth trend of Disney Company's annual revenue has declined significantly compared with the previous period. The correlation between the total revenue of the Walt Disney Company and the revenue of each business segment is estimated with the use of gray correlation matrix, and the contribution of each business segment to total revenue is further analyzed. Under the analysis of correlation model, online related business will become a new growth point for total revenue in the future. Based on the above analysis, some practical and feasible suggestions for its development are put forward.

1. Introduction

1.1 Background

The Walt Disney Company involves a wide range of business areas and diverse sources of revenue. Due to the impact of the epidemic, the Walt Disney Company, known for its theme parks, is bound to be greatly affected, and the company's future revenue trends will also change.

1.2 literature review

Revenue is an important indicator to measure the company's effectiveness. Understanding its history and current revenue more comprehensively and predicting its future revenue is very important. Nowadays, forecasts have been widely used in the modern environment. Financial forecasting not only reduces inventory costs, effectively organizes production operations and improves customer satisfaction, but more importantly, provides reference indicators for company managers and investors when making decisions or investment plans.

Due to the epidemic in 2020, the revenue of many companies has been significantly affected. In particular, companies operating public entertainment facilities have undergone major changes in their revenue due to travel restrictions and other measures. The Walt Disney Company, as an outstanding company in this field, is very representative. Therefore, this article analyzes the revenue of the Walt Disney Company to roughly understand the financial status of this company.

When researching and predicting future revenue at home and abroad, most of them use mathematical models to analyze the factors that affect revenue, and use mathematical software to realize future value changes, such as time series analysis, multiple linear regression, neural networks, etc. and pass MATLAB, Python, SPSS Wait for realization [1-5].

The time series analysis method can infer the future state of the research object based on the principle of inertia, and the method is mature and widely used in short-term forecasting [1]. For example, Luo Qinglan et al. (2020) according to the statistics of 39 departments in Guangdong Province, using intervention analysis models to obtain loss predictive values [1]; Hu Zhejia (2007) uses time series and regression analysis to establish predictive models for Company A's total collection [2].

Regression analysis method predicts variables by understanding whether two or more variables are related, the direction and intensity of the correlation, establishing mathematical models and observing specific variables [3]. Lulu Lv (2021) predicted the company's business year income by using multi-linear regression analysis [4]; Huang Zuo (2003) estimates the size of China's total insurance premiums in 2005 and 2010 [5]; Qin Quan (2015) uses a linear regression analysis method to analyze the long-term relationship between Hunan Province's fiscal revenue and expenditure [6].

Some studies have several similarities in terms of corporate revenue and the economic impact of major emergencies [1, 2, 7]. The first is that the time after the outbreak of the new crown pneumonia is relatively short, and some documents are limited to comprehensive description and qualitative judgment; the second is that the research object of predictive model analysis is mainly a single comprehensive variable, which is directly modeled and calculated for indicators such as total corporate revenue. It is easy to conceal the comprehensive information of multiple influencing factors behind the indicators, especially methods such as regression analysis and neural network are not ideal for small sample prediction problems.

Grey system theory transforms a small amount of irregular data to reflect the quasi-exponential characteristics, and then performs modeling and completes data prediction. It is an effective tool for dealing with small samples to predict the problem [8]. Yang Hua Qiang et al. (2021) proposed a multi-factor index-grey GM (1, 1) model to predict energy consumption data of tobacco companies [9]; Yang Wanying (2021) used the grey system theory prediction model to quantitatively evaluate the impact of new coronary pneumonia on the transportation industry [10]; Liu Jieling (2021) studied the influence of various factors on the development of rural tourism economy through the gray-level correlation analysis method [11].

1.3 Contributions

This paper gives some advice on the future direction of an entertainment services-based business like Disney under the impact of epidemic.

1.4 Remaining structure

The second part gives a brief introduction to the data analysis methods used in this paper. In the third part, the GM (1, 1) forecast model of the Walt Disney Company's revenue is established to predict the trend of revenue changes in the next three years. Using the grey incidence matrix, the relationship between the annual revenue of the Walt Disney Company and the revenue of each business segment was estimated, and the contribution of each business segment to the operating revenue was further analyzed

2. Research method

We use gray system analysis method. And the prediction model and correlation degree analysis algorithm used herein are referenced to the literature [8].

3. Result and discussion

3.1 Data collection and collation

According to the Walt Disney Company's financial annual report from 2012 to 2020, the changes in the Walt Disney Company's revenue from 2012 to 2020 are obtained. The cost/investment and revenue of its main business areas are shown in Table 1.

Table.1. The cost/investment and revenue of the main business areas ($ in million)

years	2020	2019	2018	2017	2016	2015	2014	2013	2012
Media network	28393	24827	24500	23510	23689	23264	21152	20356	19436
Park, experience and products	16502	26225	20296	18415	16974	16162	15099	14087	12920
Studio	9636	11127	9987	8379	9441	7366	7278	5979	5825
Direct-to-consumer	16967	9386	4651	4833	5528	4499	3985	3555	3252

Total revenue	61366	64731	54969	55137	55634	52465	48813	45041	42278
Media network (operating expense)	17387	15499	14928	14068	13571	13150	11794	11261	10535
Media network (Selling and Administrative)	2514	2361	2752	2647	2705	2869	2643	2768	2651
Park, experience and products (operating expense)	11485	14015	11590	10667	10039	9730	9106	8537	7928
Studio (operating expense)	4619	5187	4326	3667	3991	3050	3137	3012	2908
Direct-to-consumer (operating expense)	15072	8540	1882	1904	2263	2434	1683	1566	2908

3.2 Grey prediction model of the Walt Disney Company

According to Table 1, the total revenue of the Walt Disney Company from 2012 to 2019 is selected as the original data sequence:

$$x(0) = \{42278\ 45041\ 48813\ 52465\ 55634\ 55137\ 54969\ 64731\}$$

Calculate the parameters in the GM (1, 1) model by the least square method a = -0.0433, b = 44008, that is, the gray forecast model GM (1, 1) of the Walt Disney Company's profit is obtained:

$$\frac{dx^{(1)}}{dk} - 0.0433x^{(1)} = 44008 \quad (1)$$

Calculate the predicted value, absolute error and relative error of the Walt Disney Company's profit from 2012 to 2020 (Table 3). Calculate the average relative error of the Walt Disney Company's profit forecast model (1) φ= 0.0292, mean square error ratio C= 0.3101, and small error probability P=1. According to the model test level in the grey theory, the following conclusions can be drawn. According to the posterior error test, the prediction accuracy level of the Walt Disney Company's profit forecast model (1) is level 1, and the residual error test is also qualified, and the fitting effect is good. It shows that the model is credible and reliable, and can be used to make predictions. Figure 1 is a profit forecast chart.

Table.2. 2012~2020 The Walt Disney Company's profit forecast, absolute error and relative error

years	2012	2013	2014	2015	2016	2017	2018	2019
profit forecast	42278	46208	48537	50985	53555	56255	58502	62071
absolute error	0	1167	-276	-1480	-2079	1118	3533	-2600
relative error	0	0.0259	0.0056	0.0282	0.0373	0.0202	0.0642	0.041

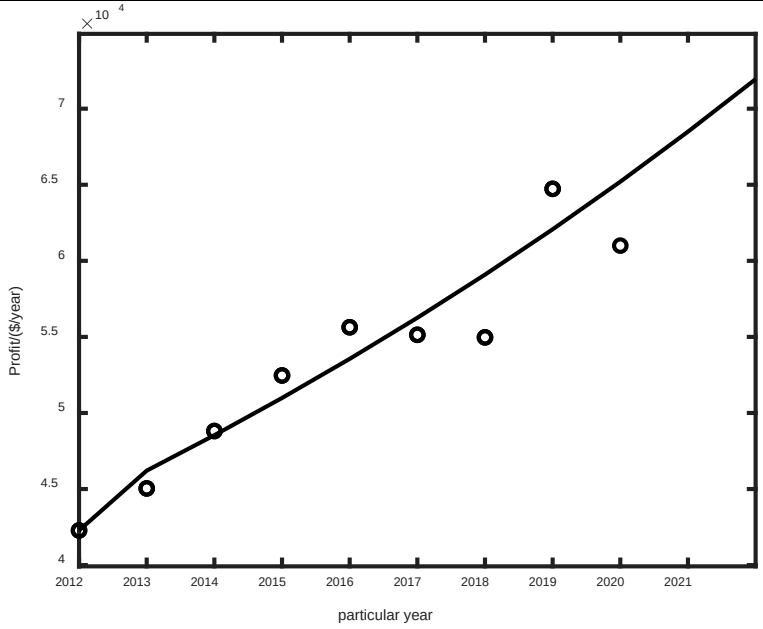

Figure 1. The Walt Disney Company profit forecast chart

Using the gray forecast GM (1, 1) model to predict and fit the revenue data from 2012 to 2019, the predicted value for 2020 is 65201, which is 3835 higher than the real revenue, and the relative error is 6.25%.

It can be seen that 2020 due to the impact of the epidemic in 2009, corporate income received a certain degree of impact. At the same time, the forecast fitting is performed on the revenue data from 2012 to 2020, and the forecast values from 2021 to 2023 are obtained as 66580, 69590 and 72737.

3.3 Impact of the COVID-19 on the Walt Disney Company's revenue

For the park segment, measures to prevent epidemic spread result in serious loss. For instance, theme parks were closed or operating at a significantly reduced capacity for a significant portion of the year; sailing and guided tours were suspended.

The epidemic has also had a huge impact on the merchandise licensing business. In other words, the company does not have sufficient content sources. This led to that the studio delayed or shorten and cancelled programs and theatrical releases, and stage play performances have been suspended since late in the second quarter. The media branch faces the same problems in Advertise selling, key live sports programming, production of most film and television content.

3.4 The correlation between the annual revenue of the Walt Disney Company and the revenue of each business segment

In order to analyze the influencing factors of the Walt Disney Company's revenue development, first, it is necessary to select the variables needed by the empirical research for the gray-level correlation analysis model. For the development of profit situation, the annual total profit and the profit characterization variables of the four business segments of media network, park, experience and products, studio and direct-to-consumer are selected, and their size directly reflects the quality of the Walt Disney Company's revenue. For the factors affecting the development of profitability, it is necessary to select Media network operating expenses, Media network sales and management expense, park, experience and products operating expenses, studio operating expenses, and direct-to-consumer operating expenses as characterizing variables to analyze the impact of the investment of various business modules on the total profit.

According to Table 1, the profitability of the Walt Disney Company from 2015 to 2019 is selected as the original reference series, and each row is the profit of the four business segments of Media network, park, experience and products, studio, and direct-to-consumer from 2015 to 2019 and total profit:

$$X_0=\begin{bmatrix}23264 & 23689 & 23510 & 24500 & 24827\\ 16162 & 16974 & 18415 & 20296 & 26225\\ 7366 & 9441 & 8379 & 9987 & 11127\\ 4499 & 5528 & 4833 & 4651 & 9386\\ 52465 & 55634 & 55137 & 54969 & 64731\end{bmatrix}$$

Select the investment of each module of the Walt Disney Company from 2015 to 2019 as the original series to be compared, each row of which is the operating cost of Media network, the sales and management cost of Media network, and the operating cost of park, experience and products from 2015 to 2019, studio operating expenses and direct-to-consumer operating expenses:

$$X_1=\begin{bmatrix}13150 & 13571 & 14068 & 14928 & 15499\\ 2869 & 2705 & 2647 & 2752 & 2361\\ 9730 & 10039 & 10667 & 11590 & 14015\\ 3050 & 3991 & 3667 & 4326 & 5187\\ 2434 & 2263 & 1904 & 1882 & 8540\end{bmatrix}$$

On the basis of this data, according to the correlation analysis in gray theory, the correlation coefficient and correlation matrix are determined, and graphs are drawn. First, obtain the correlation coefficient and the correlation matrix R as:

$$R=\begin{bmatrix}0.9592 & 0.9273 & 0.9175 & 0.8200 & 0.7843\\ 0.8958 & 0.8025 & 0.9422 & 0.8998 & 0.7214\\ 0.8613 & 0.7756 & 0.9106 & 0.9388 & 0.6884\\ 0.8183 & 0.7606 & 0.8192 & 0.8088 & 0.6956\\ 0.9683 & 0.8935 & 0.9343 & 0.8333 & 0.7690\end{bmatrix}$$

The r_1 in the first row of the gray correlation matrix R represents the correlation between each cost item calculated according to associated coefficient matrix and the profit of the Media network; r_2 in the second row of R represents each calculation calculated according to associated coefficient matrix ,the degree of correlation between cost items and the profit of park, experience and products; r_3 in the third row of R represents the degree of correlation between each cost item and studio profit calculated according to associated coefficient matrix; r_4 in the fourth row represents the correlation between each cost item calculated according to associated coefficient matrix and direct-to-consumer profit; r_5 in the fifth row represents the correlation between each cost item calculated according to associated coefficient matrix and the total profit. Figure 2 shows the gray correlation diagram of investment and profit.

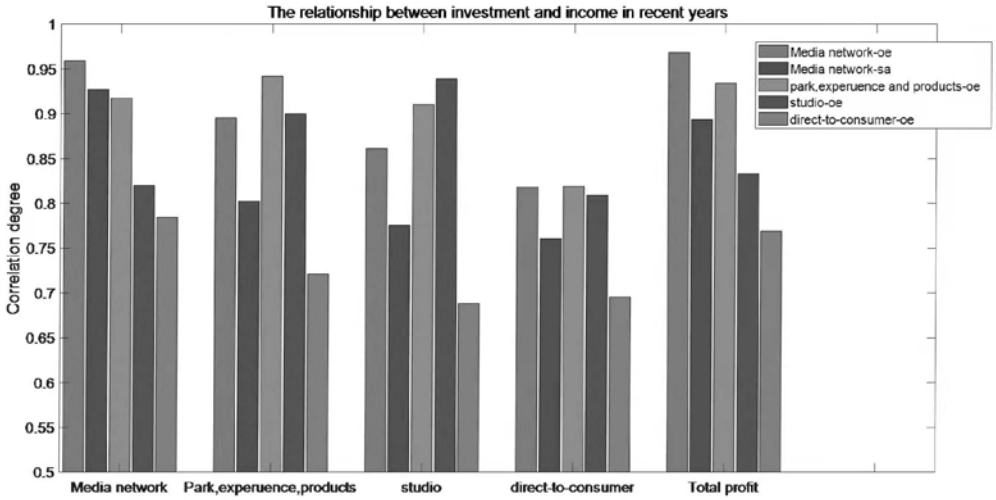

Figure 2. Gray correlation diagram of investment and profit (2015~2019)

In the figure, Media network-oe represents the operating expenses of the Media network, and Media network-sa represents the sales and management expenses of the Media network, park, experience and products-oe represents the operating expenses of the park, experience and products, studio-oe represents the operating expenses of the studio, direct-to-consumer-oe represents the operating expenses of the direct-to-consumer.

According to the graph and R matrix data, the analysis is as follows:

1) Observe singular data and inflection point data first, r51=0.9683 is the largest, followed by r53=0.9343, which indicates that the investment in the operating expenses of Media network and the operating expenses of park, experience and products has the greatest impact on total revenue, which is also the main component of cost. That is, appropriately increasing investment in these two sectors can significantly drive the increase in total revenue.

2) In r5, r55=0.7690 is the smallest, indicating that direct-to-consumer's operating expense investment has a small impact on total revenue, which is also reflected in its numerical value lower than other modules.

When the investment and profitability of the Walt Disney Company from 2015 to 2020 are selected for correlation analysis, due to the impact of the epidemic in 2020, the data has become quite anomalous, leading to major changes in the correlation between costs and profits obtained from the analysis, as shown in the gray correlation diagram of investment and profit in Figure 3.

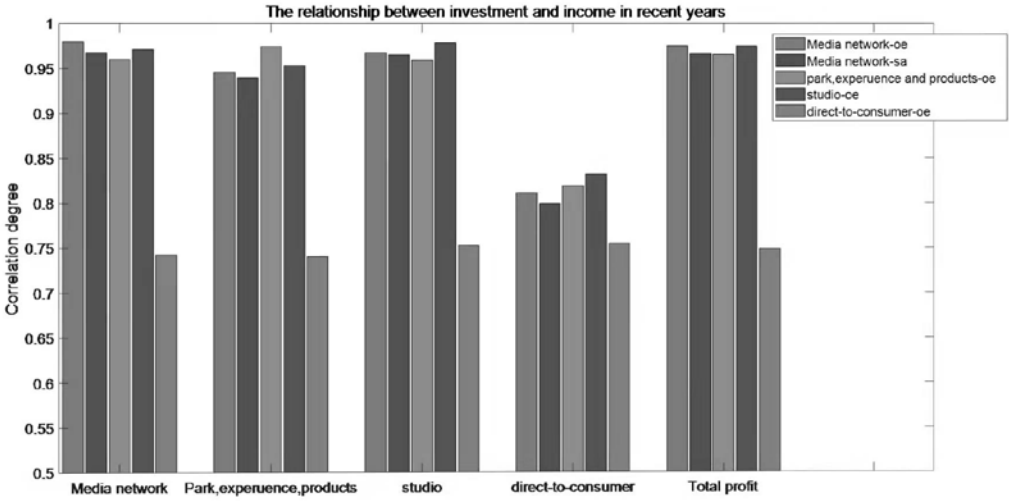

Figure 3. Gray correlation diagram of investment and profit (2015~2020)

Comparing Figure 2 and Figure 3, it can be seen that in the investment of the main business modules, r53 has further increased, indicating that the investment in the operating expenses of park, experience and products has a further increase in the total revenue. It shows that projects such as parks, experience and products that require personnel to participate in the field are most affected by the epidemic.

In this part, the GM (1, 1) forecast model of the Walt Disney Company's revenue is established by sorting out the cost/investment and revenue of the main business areas of the Walt Disney Company from 2012 to 2020 to predict the trend of revenue changes in the next three years, and tested the model. The gray incidence matrix is used to estimate the correlation between the Walt Disney Company's annual revenue and the revenue of each business segment, and further analyze the contribution of each business segment to operating revenue.

3.5 Recommendations for the future development of the Walt Disney Company

The correlation analysis shows that the media business and the parks-related business had the greatest impact on total revenue. And the epidemic has a huge impact on businesses like the parks business that require personal involvement of personnel. Therefore, during such times, more investment should be made in online business units such as media. For example, strengthening the operation of the cable and broadcast networks, as well as enhancing television production. Although revenues from the direct-to-consumer are not very relevant to total revenues, Disney's new streaming business, which was developed last year, holds great promise, and continued strengthening in this area will make Disney profitable in a few years' time.

4. Conclusion

Through research, the company's revenue is heavily influenced by the international environment. Therefore, in the coming years, the focus should be on examining how Disney should rationalize its related businesses to maximize revenue in the light of the impact of the epidemic. From the correlation analysis, it is known that Disney should focus on online businesses such as media to gain more revenue.

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