

METHODS

Application of Altman's Z-score model in predicting business failures of selective hospitality companies in India

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Business failure and bankruptcy are the two words that create panic among stakeholders of the organization. However, with a challenging environment, businesses feel the heat and struggle to make big in the long run. It is recommended to foresee the warning signs and predict business failures to avoid company-specific catastrophes. Numerous predictive models were developed over the last six to seven decades, and among many, Altman's Z-score model is considered one of the highly reliable models in predicting business failure. The purpose of the research is to find out the financial performance of the companies selected for the study and to identify whether business failure can be predicted in advance to manage future risks. This paper considers Altman's Z-score model that is used to predict business failures of public companies. A total of 10 hospitality organizations listed in the National Stock Exchange of India are considered for the study. The study analyzes the 5-year financial data from the 2018 to 2022 period. The study reveals that hospitality companies in India are undergoing a difficult phase post-pandemic. Nine out of ten companies selected for the study showed signs of bankruptcy as Altman's Z-score of companies considered for the study is lower than 1.8 which is in the distress zone.

Keywords: business failures, Altman Z-score, financial distress, hospitality, services companies, financial ratios, India

Introduction

A business can fail if it does not have enough adequate cash flows to meet its expenses. Most business crises are only recognized once they become evident in reduced sales or the continuous loss of revenue. Identifying early warnings of the coming financial crisis is important not only to management but mainly to the stakeholders. Prediction of business failure is a vital issue in any economy. Prediction of business distress is done using mathematical or statistical models that predict the company will go through a financial crisis based on the present financial condition. A range of models have been developed in academic pieces of literature, and one among them is the Z-score model given by Altman in 1968. Using financial statements, Altman compiled significant

financial ratios for assessment. He analyzed the variables into five standard ratios such as liquidity, profitability, leverage, solvency, and activity. Altman (1) applied a multivariate analysis method to predict the chances of the business going bankrupt in 2 years. Altman's model is considered one of the good methods for predicting financial distress. According to various studies, the model showed an accuracy of more than 72% in predicting insolvency 2 years prior to it occurred.

In the Indian environment, prediction research is still evolving and is largely based on market variables. Studies cannot be carried on in the absence of data on distressed companies, and academic research has used rating data available from secondary sources to determine distressed companies (Senapathi, 2016). Initial attempts in predicting business failure naturally relied on analysis of individual

performance measurements, mainly based on financial ratios up to the 1960s. In the late 1960s, Altman's Z-score model was the first move toward considering a string of weighted ratios for the statistical technique (MDA) to arrive at a final score and ascertain the likeliness of failure (Wilkinson, 2009). Many studies have been undertaken to find the reasons for business failures from a global perspective. Many studies have found that lack of financing, inadequate management, poor business model, economic environment of the country, and unsuccessful marketing strategies are some reasons for business failures. There are limited studies and literature undertaken in the Indian context, especially the use of Altman's model in Indian companies. The paper tries to find out the relevance of the Z-score to listed hospitality corporations in India as very limited pieces of literature we find in the hospitality sector. I am applying the Altman original Z-score model as it is very much applicable to public companies hoping that the model will do correct predictions.

Overview of the hospitality sector

Hospitality is considered the spirit of India, though; transforming it into a commercial industry is a proud moment for the country. Urbanization and rural growth have led to speedy economic development. India ranks most popular travel destination in the world. It influenced the Indian tourism and hospitality industry to come out as one of the drivers of growth in Indian services. The Indian tourism and hospitality industry contribution during 2019 was 6.8% of the GDP; this sector creates 8% of total employment in the country. "The Indian hospitality market inclusive of domestic, inbound and outbound likely to reach US\$ 52 billion by FY2027. More than 30 billion international tourist are expected to visit India by 2028. Motivated by the surging demand from travelers and sustained efforts of travel agencies market is probable to grow strongly" (IBEF, 2022). During 2016, the tourism and hospitality industry in India has been affected due to demonetization as many customers were in the category of paying in cash, which led to a drop in hotel bookings. But, that situation was resolved within a few months as customers adapted to digital money. Later, the introduction of GST also affected the hospitality sector; there were often changes in the GST rates that made a difference in revenue generation. During the year 2022, the GST rates were once again revised to higher levels, which may bring in short-term fluctuations in demand.

The COVID-19 pandemic has triggered one of the worst demand crashes the global and Indian hospitality industry has witnessed in recorded history, in terms of a fall in average room rates (ARR), revenues, profitability, and deteriorating debt repayment ability. The India lockdowns led to the shutting of hotels across the country (2). Demand petered off to below sustenance levels. Occupancy in the premium hotel category dropped from 30–40% to 8–12% in Q1 FY2021. The

ARR dropped by 30–50% across markets. During Q1 FY2021, hospitality companies showed an 86% reduction in revenues with huge working costs and net losses.

Review of literature

The following literature studies provide evidence of the Altman model in predicting business failures. Altman (1) used MDA to the problem of company failure prediction and computed the Z-score. Altman et al. (3) updated the original model into a better-performing Zeta model for analysis. Altman (4) economic factors influence business failure. The study concentrated on US firms and explored some of the factors that influence business performance such as economic growth, capital market performance, liquidity, and increased company formations. Altman (2000) discussed two of the admired models for assessing business failures. These are the original and ZETA model. The ZETA model included cash flow measures in the model tests. Kroeze (5) used a new bankruptcy prediction model, which employed financial ratios and MDA to predict bankruptcy. The new model is a modification and simplification of a traditional failure prediction model, the Z-score model. The new model called the Kroeze model correctly predicted bankruptcy 93.3, 81, and 68.8% of the time, 1, 2, and 3 years ahead of the event, respectively. Diakomihalis (6) evaluated Altman's three Z1, Z2, and Z3 models for hotel companies in Greece; the results showed that the first model was more accurate in predicting bankruptcy compared to later models, and overall, all three models were able to predict bankruptcy in hotel enterprises. Anjum's (2012) comparative study between three Altman's models reveals that all three models exhibit the accuracy of predicting business failure by more than 90% before 2 years of bankruptcy. Kumar and Anand (7) analyzed the Kingfisher airline company by using Altman's Z-score model which is able to predict the bankruptcy in advance. Rahman et al. (2016) application of the Z-score on state-owned and private banks in Bangladesh revealed that the state-owned banks are safer than the private as the Z-score was able to predict failure. Panigrahi (8) Z-model on selective Indian-listed pharmaceutical companies revealed the healthy position of companies as they were above the distress level. Ramachandran and Aamir (9) examined the Telcom companies under Gulf Cooperation Council. Altman's Z-score model applied for the study showed that the companies are in safe zones as their Z-score is above the gray level. Arini et al.'s (2020) application of the Z-score model on advertising, print, and media companies in Indonesia resulted in the evaluation of the financial performance outcome of the companies to take corrective actions. Divekar and Sukhari's (10) investigation into predicting business failures using the Altman Z-score model to companies in the aviation sector revealed that the financial state of

the companies is in bad shape and all companies are in distress region.

From the above literature review, it is clear that the Z-score model is highly reliable and is applicable to not only US firms or manufacturing firms but also public service companies. The main gap I found in considering my study is that there is very less academic research literature on business failure prediction from the Indian perspective and also on the hospitality sector which is highly volatile and became susceptible after the COVID-19 pandemic that severely hurt the hospitality and tourism industry.

Research objectives

The objectives of the study are as follows:

1. To study the validity of the Z-score model on listed hospitality companies in India.
2. To discover the performance of the hospitality sector in India.

Data and methodology

The study attempts to find out the financial position and predict the business failure of hospitality companies listed in NSE India. The study is depending on the financial data collected solely from a secondary source moneycontrol.com. A total of 10 companies are considered which are not declared as financially distressed companies. The selection of the companies is done based on the current market price; all 10 companies which are quoting CMP of less than Rs. 800 are picked. The study is undertaken for the 5-year financial period from 2018 to 2022. MS Excel is used to compute the financial ratios and the Z-score model.

Specification of the Z-score model

Altman (1) model analyzes five ratios that are based on and summed up to arrive at the score. It helps to determine the financial viability of the firm under study.

Altman Z-score formula:

$$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$$

$X_1 = WC/TC$

$X_2 = RE/TA$

$X_3 = EBIT/TA$

$X_4 = MC/TL$

$X_5 = SL/TA$

The results are interpreted in the following manner:

Z-Score < 1.81—Distress Zone (High possibility of insolvency)

Z-Score 1.81–2.99—Gray Zone (Moderate risk of bankruptcy)

Z-Score > 2.99—Safe Zone (Low possibility of bankruptcy)

Data analysis and interpretation

Table 1 is based on our own calculations using Altman (1) model on 10 companies for 5 years, and **Table 2** shows the revenue data of 10 hospitality companies for a period of 5 years (11).

X1—Ratio exhibits the liquidity situation of the company compared to its size. The study shows that Mahindra Holidays is the only company that has better ratios compared remaining nine companies. This shows that companies are facing regular operating losses.

X2—It is retained earnings over total assets; the ratio of all 10 companies is very poor in the last 5 years. It is due to companies making low profits and incurring losses in the last 5 years. This situation is not a good sign because companies need to borrow to fund their assets, and in return, it will add more cost to companies.

X3—This ratio measures EBIT over total assets and measures productivity; this ratio helps in predicting bankruptcy. The Lemon Tree Hotel is the only company whose ratio is better than other companies, as the companies' incurring losses have led to poor ratios in the last 5 years.

X4—The ratio of market capitalization over total liabilities measures how company assets can reduce in value before liabilities exceed the asset when it becomes insolvent. The ratios of four companies, namely, Lemon Tree, Mahindra Holidays, Indian Hotels, and Westlife food worlds are good, which indicates that an investor can invest in these companies against the remaining.

X5—This ratio indicates sales over total assets; it assesses companies' ability of companies' assets to produce sales. The only Westlife Foodworld Company has a better ratio than its peer companies; overall, the ratios of the companies for the last 5 years are below 1.

The analysis of **Table 1** of 10 selective hospitality companies reveals that the hospitality sector is under a stressful situation and facing a huge challenge. The industry has gone through a very difficult phase of the COVID-19 pandemic that resulted in huge losses for the companies. Huge competition, a challenging economic environment, inflation, high debt costs, and so on negatively impacted the growth of the companies. Out of 10 companies under the study, most of them have high current liabilities. Mahindra Holidays and Resorts and Indian Hotels made profits three times out of the last 5 years. Three companies, namely, Kamath Hotels, Lemon Tree Hotel, and Westlife

TABLE 1 | Altman Z-score of hospitality companies for the period 2018–2022.

Companies	Year					Mean	SD
	2022	2021	2020	2019	2018		
Kamath	− 0.96	1.83	1.04	0.91	1.07	0.778	1.0366629
Oriental	1.26	0.31	0.52	0.66	0.94	0.738	0.3708369
Mahindra	1.49	0.6	0.55	0.71	1.1	0.89	0.3988107
Lemon	1.79	2.66	0.87	2.1	0.9	1.664	0.7765501
Chalet	0.8	0.94	0.76	1.65	0.08	0.846	0.5593568
HLV	0.28	0.03	0.01	0.08	0.02	0.084	0.1128273
Country	− 0.24	0.06	0.05	0.04	0.05	− 0.008	0.1298846
Indian	1.63	2.24	0.89	1.52	1.86	1.628	0.4961552
Asian	− 1.35	0.25	0.06	0.05	0.08	− 0.182	0.6580046
Westlife	1.85	11.02	12.22	1.56	2.65	5.86	5.2903072
Mean	0.655	1.994	1.697	0.928	0.875		
SD	1.1700451	3.3087232	3.7165936	0.7485512	0.8749635		

Source: Researchers' findings.

TABLE 2 | Revenue data of selected companies for the period 2018–2022 (crore).

Company	Year				
	2018	2019	2020	2021	2022
Kamath Hotels	198	236	221	65	144
Oriental	357	346	291	115	219
Mahindra	2316	2238	2371	1729	2013
Lemon tree	484	549	669	251	402
Chalet	815	987	981	294	507
HLV	187	154	145	18	78
Country Club	330	264	152	47	56
Indian	4103	4512	4463	1575	3056
Asian	274	273	252	72	130
Westlife	1134	1402	1547	986	1576
Average	1019.8	1096.1	1109.2	515.2	818.1

Source: (11).

Foodworld made profits 2 years out of the last 5 years. The remaining five hotels presented in **Table 1** incurred losses from 2018 to 2022. All companies in major are facing a liquidity crunch and due to low retained earnings companies need to rely on external borrowing, which results in increased borrowing costs. A very good sign we can see from the above companies' data is that sales are improving after the post-pandemic period; this may churn the companies' fortune in the coming days and improve the investors' wealth.

Table 1 and **Figure 1** illustrate the summary of the mean Z-score of 10 companies for the period 2018–2022. All companies except Westlife Foodworld Ltd. are in the safe zone with a mean of 5.86, and the rest companies' Z-score value is below 1.8 which is considered a distress zone. The mean Z-score of Lemon Tree Hotel and Indian

Hotels is around 1.6 which is still in the distress zone, but with better strategies, it can raise to the gray region. If considering the year-wise mean of 10 companies, the Z-score in the year 2021 is 1.994 which is in the gray zone and the Z-score in the years 2018, 2019, 2020, and 2022 is below the threshold limit of 1.8. The standard deviation values also exhibit values that highly differ from mean values. By analyzing the above table, we can understand that companies in the hospitality sector face tremendous pressure to sustain and make profits. A total of 9 out of 10 companies selected for the study showed signs of bankruptcy; most importantly, the Z scores of all companies considered for the study are highly fluctuating year on year and there is no consistency, which reveals that the companies are trying to perform by improving sales and that the industry is recovering from pandemic blues; this will may help companies move away from distress zones to safe zones in the coming years.

The above results reveal that Altman's Z-score model shows companies are in a distress zone, despite that companies are not going bankrupt. This makes us think about whether the latest version of Z-score models can predict better needs to be taken up for future study, but we need to look into deeper other financial factors making these companies sustainable.

Table 2 presents the revenue data (11) which show that 8 out of 10 companies' revenue for the period 2018–2020 is consistent, but in the year 2021, there is a deep fall in revenue numbers of all 10 companies due to the pandemic, which put the hospitality industry in turmoil. But, in the year 2022, growth in revenue numbers gave a great push to companies and it is a great sign of coming back for companies. I feel this is one of the reasons the hospitality companies were able to avoid bankruptcy. The above data depict that operating revenue makes a big portion of the

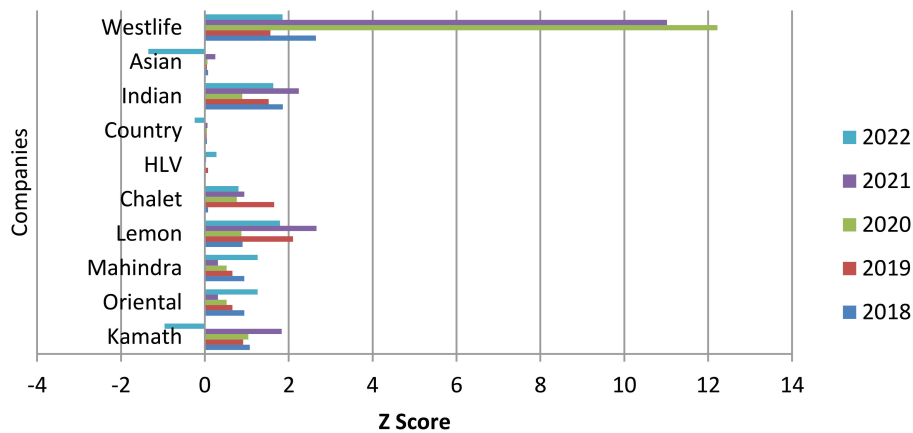


FIGURE 1 | Altman Z-score of hospitality companies for the period 2018–2022.

total revenue and non-operating is a very small portion of the total revenue by looking at the year 2021 values. The companies may be able to avoid bankruptcy situations if the demand of the hospitality industry grows further and companies generate more revenue by implementing the right business models.

Conclusion

The efficiency of Z-score model on chosen Indian hospitality companies uncovered interesting findings. The study shows that the hospitality sector is in turbulence as the majority of companies in the last 5 years are in distress level. Lower liquidity, lower retained earnings, and higher liabilities push the companies toward bankruptcy. There are various reasons for the poor performance of the sector—a favorable economic environment, supportive Government initiatives, and consumer demand can change the fate of the companies. The Z-score model holds good for publicly traded companies as it predicts business failure more accurately based on the previous studies. Investors must consider the Z-score before investing in the companies as it will protect against the losses that may incur due to the company going bankrupt. The restrictions of the study are that criteria selected while choosing the companies were based on the market price of the share; hotel size, geographic presence, hotel category, client base, macro-economic factors, and so on were not considered. There is a high likelihood that one of the financial performance indicators such as revenue numbers makes companies avoid bankruptcy.

The study also raises the question of how companies are operating because for the past 5 years, the major companies selected for the study were in a distress zone and, despite this fact, they were able to sustain, continue to do business, and not go bankrupt. This makes us think about whether the applicability of Altman's model does not hold well for Indian hospitality companies in predicting business failures.

A further study could be carried out with bigger data and by revising the model to be suitable for India.

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