Application of Altman Modified Z-Score to Predict Financial Distress in the Indian Telecommunications Industry with respect to Select Telecommunication Companies

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Abstract—**This study applies the Altman Z-Score model to analyze and evaluate the financial strength and insolvency risk of major telecom companies in India— BSNL, RJIL, BAL, and VIL. Outcomes reveal that BSNL, BAL, and VIL lie in the distress zone, reflecting weak solvency and high bankruptcy risk, while RJIL shows moderate stability in the grey zone. The research highlights the need for debt restructuring, cost optimization, policy reforms, and innovation-led growth. Altman's model proves valuable for early detection of financial distress and guiding sustainable strategies in India's telecom industry.**

Index Terms—**Finance, Liquidity, Profitability, Banckruptcy**

I. INTRODUCTION

Financial problems experienced by the company characterizes corporate bankruptcy, generally starting from liquidity problems and then solvency. If management ignores the financial issues right away, the business will go through financial hardship before suffering severe bankruptcy issues and going through liquidation (Fithri, 2010; Santosa, 2011). Financially defaulting organizations are those that, while having more assets than liabilities, cannot afford to pay their debts when they mature (Fifrianti & Santosa, 2018; Van Horne & Wachowics, 2011). An more volatile business environment and intense competition impact a company's financial performance dynamics. Dynamics in the fields of information technology, politics, economy, and society all influence changes in Indonesia's telecommunications industry. Businesses who can not change with their surroundings will face challenges.

The dynamics of a company's financial performance are influenced by an increasingly turbulent business environment and increasingly fierce competition. Dynamics in the fields of information technology, politics, economy, and society all influence changes in Indonesia's telecommunications industry. Businesses who can not change with their surroundings may face hazards to their investments and commercial operations. Businesses are always exposed to a variety of risks, including financial, business, and national hazards, which frequently result in bankruptcy and financial hardship (Fifrianti & Santosa, 2018). A company's bankruptcy typically starts with financial difficulties, which includes unstable income, uncollectible receivables, inventory issues, asset turnover, and declining profitability (Santosa, 2010).

Forecasts regarding the company's financial status in relation to bankruptcy are crucial data for all parties involved, including investors, creditors, auditors, regulators, and management (Butet, 2012). A firm may go through several stages of financial difficulties before to bankruptcy. This is the reason it is crucial to introduce people to the state of financially distressed enterprises as soon as possible. Prior knowledge of the company's financial crisis circumstances gives management, owners, investors, regulators, and other stakeholders the chance to work consistently (Brigham & Houston, 2016). Owners and management have a stake in preventing increasingly dire circumstances that could lead to bankruptcy. Investors are interested in restructuring capital structures and making

judgments about investments or divestitures (Subrahmanyam, 2014).

According to Fifrianti & Santosa (2018), an early warning system model could be used to identify financial distress conditions sooner, before they arise. This approach can be broadly applied to recognize the signs of corporate financial distress, and management will now work to enhance capital structure and liquidity before the situation worsens or the company files for bankruptcy (Santosa, 2010). Bankruptcy researches are quite massive, and several of them have developed prediction models that try to help potential investors and creditors in choosing the company where to put their funds so as not to get caught up in the financial distress problem. The prediction models of bankruptcy are among others, put forward by Altman (1968), Springate (1978), Ohlson (1980), and Zmijewski (1983).

Two important factors that lead to a company's insolvency are internal and external challenges. According to Fithri (2010), management strategies are typically to blame for internal factors problems rather than market conditions. Alternatively, management may fail to closely monitor evolving market developments, resulting in a lack of profits to meet the company's obligations. On the other hand, foreign issues are typically brought on by Indonesia's and the world's still unstable economies. The cause of the high risk of a company experiencing financial difficulties or even bankruptcy if the company is not ready to face current developments (Fifrianti & Santosa, 2018).

The telecommunications industry has a big business and technological risks so that the industry is vulnerable to changes in its business environment, including strict government regulations and favoring State Owned Enterprises. Besides, the telecommunications industry requires a large investment, rapid technological development, sharp tariff competition, and rapid changes in customer tastes, especially millennials. For example, the case of companies experiencing financial distress is BSNL. Each year, BSNL loses Rs.5,000 crore since year 2010 and has been struggling in acquiring 5G technology which requires huge investment.

Financial statements issued by companies are one source of information about the company's financial position, performance, and changes in the company's financial position, which is very useful to support the right decision making. Financial data in financial statements are useful to see the condition of the company's financial health.

This study analyzes the performance of 4 major Telecom Companies during the period of 20 to 2024. The study has identified some internal and external factors affecting the performance of the telecom companies in context of financial health. Profitability is necessary for survival and growth of any organization. Telecom sector has solid impact on the economy of a nation. The essential part of this section is to make the financial system appealing, boost the economy out of intervention and empower financial system that are basic for the economy of the nation. Telecom Sector serves as the foundation of economy which helps in gathering information for the general public, business organizations and government as well. The telecommunication companies give various services to their customers. Telecom sector assume vital part in financial advancement of any nation, particularly in developing nations like India, where there is deficiency of capital. Telecom sector turns out to be more essential. Telecom sector is instrumental in the development of the country. Telecommunication is omnipresent and it has taken the form of a necessity in every sphere of life either it be an economy, entertainment, welfare or defence of our country.

As of March 31, 2024, the subscriber base of India's telecom industry was 1.9 billion. Private telecom service providers (RJIL, BAL and VIL) dominate the Indian wireless telephone subscription market, holding a 92.26 percent share. In contrast, public sector undertakings (PSUs), specifically BSNL and MTNL, account for only 7.74 percent of the market share. The Adjusted Gross Revenue share for PSUs declined to 6.64 percent in 2023-24, down from 7.04 percent the previous year. However, their AGR contribution slightly increased to INR 179.73 billion (US$2.14 billion) in 2023-24, up from INR 176.05 billion (US$2.09 billion) in 2022-23.

India is a large country and its telecom sector is still growing. Financial soundness of telecom sector has huge impact on economy of a country and for investors. Financial soundness of telecom sector has impact not only on owners but also on other stakeholders like investors, creditors, shareholders, and economy as well. Number of authors and researchers have done works on profitability, performances of telecom companies and the main motivation to conduct this research is to predict the

bankruptcy of telecom company especially the BSNL. In India, there are four major telecom companies and this study tried to explore the financial soundness of 4 major companies, namely Bharat Sanchar Nigam Ltd. (BSNL), Reliance Jio Infocom Ltd. (RJIL), Bharti Airtel Ltd. (BAL) and Vodafone Idea Ltd. (VIL) by using Altman's Z-Score model.

Table – 1 Market share of Telecom Companies in India

Telecom Operator	Market Share
Reliance Jio	40.30%
Bharti Airtel	33.10%
Vodafone Idea	18.86%
BSNL	7.57%
MTNL	0.17%
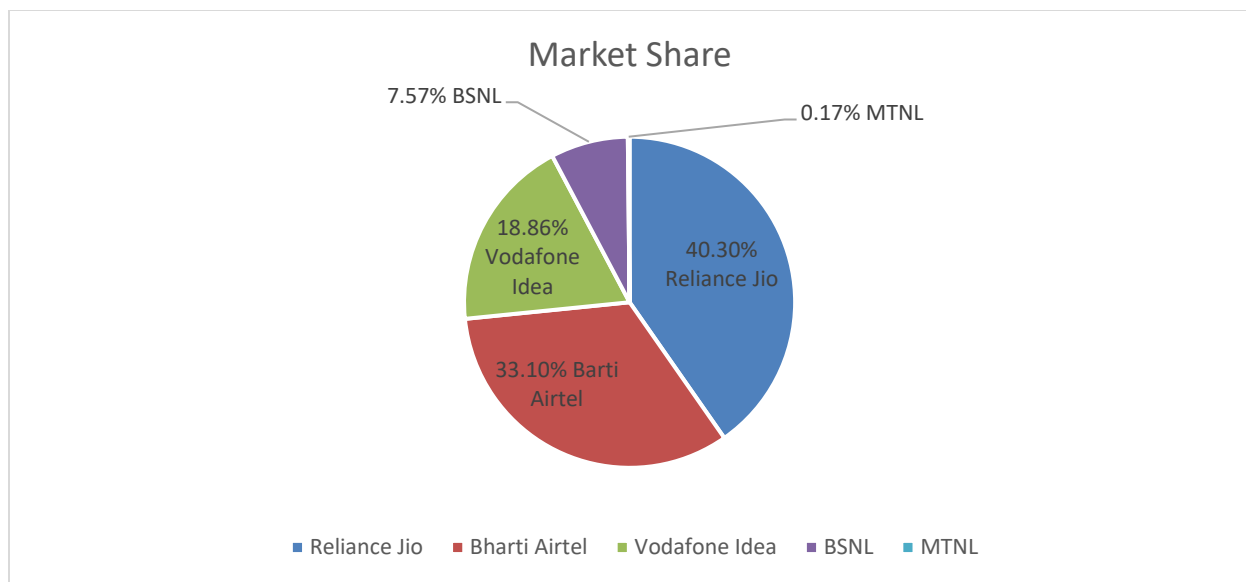
Source: www.trai.gov.in

II. LITERATURE REIVEW

Some of the previous research related to company bankruptcy, conducted by several previous researchers are as follows:

Brimantyo et al. (2013), who found by applying the Altman Z-Score method, the entire company that was the object of research showed an unhealthy financial performance in the 2009-2011 period and potentially bankruptcy. Almost all companies are predicted to go bankrupt because the Z-Score value of the company recorded a value below 1.81. From several companies studied, PT. Smartfren Telecom Tbk has the worst Z-Score because it showed a negative Zscore value for three years in a row in 2009- 2011.

Adeola, (2016). The researcher states that the telecommunications industry is crucial to the progress of any nation's economy because of the substantial contributions it makes to the GDP and the subsequent development and expansion of the country. Only with a fully built and sufficient telecommunications infrastructure can a country enjoy maximum development.

Sarfraz, R. (2017). The researcher states that although getting new consumers is necessary, retaining existing ones is more desired and lucrative. Telecom service providers should make attempts to gain new consumers, but they should not overlook the importance and advantages of maintaining existing customers, since retaining customers costs far less than acquiring new ones.

Singh, R. (2017). The researcher claimed that the huge

entrance that Reliance Jio made into the industry causes a lot of significant and unforeseen changes in consumer attitudes and views. It causes ambiguity, and the major service providers on the market start talking about merging or acquiring other companies. In addition, he noted that as a result of the exiting obstacles in the sector, they would not be able to go out of the industry, and it gets extremely challenging for tiny companies in the market to exist.

Yadagiri et al,. (2018). This paper gives the glance on the operating profit of BSNL, which can be valuable for policymakers, financial stakeholder, and other different stakeholders in the telecom arena. The analysis of profit patterns in various sections of BSNL's administrations can help the organization in demarketing areas of development and expansion. The review features the significance of bridging the rural and urban gap in the ICT area, which can have critical social and financial advantages for the country. The paper reflects by reducing the employee benefit costs and other operating costs, the BSNL can come in profit in this cut throat competitive environment.

Problem Statement:

Despite the telecom sector crucial role in national development and digital connectivity, almost all companies have been struggling to maintain financial stability. For example - the financial crisis of Vodafone Idea, the rising losses of BSNL, and the growing dominance of Reliance Jio clearly shows the uneven financial performance within the industry. In this context, there is a pressing need to assess the financial health and bankruptcy risk of telecom firms using reliable predictive models, the Altman Modified Z-Score model.

Scope of the Study: This examination explores and investigate the financial positions and financial health of BSNL, Jio, Airtel and Vodafone Idea by Z score model based on openly accessible data of four telecom companies financial balance Sheets. Altman's Z score model was utilized to access the financial wellbeing of the telecom companies and analyze the chances of insolvency. The Z Score Modal utilizes different accounting Ratio to anticipate the future insolvency. And furthermore, gives a quantitative measure to identify shortcomings early also, promote certainty to make strategies and arrangement to beat outcomes.

Objective
To evaluate the effectiveness of the Altman Modified Z-Score model in predicting financial distress within the select companies of Indian telecommunications sector.

Research Design and Methodology:
It is quantitative in nature and based on financial data which are collected from 2020 to 2024. The population of this study is telecom sector only. In this study four telecom companies are taken as sample of study which are BSNL, RJIL, BAL and VIL. In order to organize the data and to achieve the goals of the study, statistical analysis and Altman's Z score model was applied to evaluate the telecom companies' financial statements. Altman's' Z Score Model: Altman Z score model is utilized as a part of the course of deciding the financial status of 4 telecom companies of India. The first Altman Z Score Model created in 1968, was at first assess of Manufacturing organizations. At that point this model was re-examined in 1977. At that point it is additionally re-examined to apply it on non-manufacturing organizations and developing markets. Telecom companies having Z score more than 2.6 are thought to be exceptionally sound having no way of liquidation. Telecom companies having Z score under 1.1 are considered to fall in bankruptcy zone, along these lines having exceptionally poor execution. The middle of 1.1 and 2.6 is thought to be grey area having sound health of performance.

Altman Modified Z-Score
Increasingly complex business environment conditions encourage adjustments to various types of companies because their characteristics differ in each sector, Altman then modifies the model again so that it can be applied to all companies, such as manufacturing, non-manufacturing, and bond issuing companies in emerging markets (Fifrianti & Santosa, 2018). In this Modified Z-Score Altman eliminates variable X5 (sales / total assets), because this ratio is very varied in industries with different asset sizes. The following Z-Score equation is modified by Altman et al. (1995):

$$Z = 6.56\,X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Where:

Z = bankruptcy index

X_1 = working capital / total assets

X_2 = retained earnings / total assets

X_3= earnings before interest and taxes / total assets

X_4= market value of equity / total liabilities

The classification of a good and bankrupt company is based on the Z-score of the Modified Altman model, namely:

a. If the value of Z <1.1, including the bankrupt company.

b. If the value of 1.1 <Z <2.6 is included in the gray area (it cannot be determined whether the company is healthy or bankrupt).

c. If the value of Z> 2.6, including companies that are not bankrupt.

Research Frameworks

Z=6.56 X1+3.26X2+6.72X3+1.05X4

Indicators used for prediction of Insolvency:

X_1=Current Assets- Current Labilities/ Total Assets

X_2 estimates banks' ability to cover financial obligation. It is a liquidity Ratio reflecting the net liquid assets of the bank divided to the assets. If the value this variable decreases indicates the financial deterioration of financial health of the bank, whereas a high value of this variable reflects the reduction of the debts as opposed to the current assets.

X_2=Retained Earning /Total Assets

X_2 measures how many the part of profits is invested in the business as compared to total assets. According to Altman, this variable reports the total amount of reinvested earnings and or losses of a firm over the entire life. It is foremost connected to the numbers of years of the telecoms and sensitive to manipulation of the financial statements to show the profit of the telecoms in the form of dividend or reinvestment. It also shows the capacity of the bank earn and accumulate profit based on assets.

X_3=Earnings Before Income and Tax/Total Assets

X_3 express the managerial efficiency in terms of profitability of the business. These variable measures the productivity of a company's total assets notwithstanding any interest or tax on it. It also reflects the ability of the telecoms in generating profits from their assets.

X_4=Book Value of Equity/Total Labilitie**s**

X_4 express the financial leverage that is how many equity and liability are used to finance the asset of the company. This variable reflects the financial stability of telecoms in long term. According to Altman decline in the value of assets before the liabilities exceed the assets and the firm becomes insolvent. The variable value high or low depend on debt policy of a telecom company.

III. DATA ANALYSIS

TABLE – 2.1 DATA FOR ALTMAN Z-SCORE BHARAT SANCHAR NIGAM LTD. (BSNL)

Particulars	2021	2022	2023	2024
CURRENT ASSETS	29492.83	28170.60	33784.01	40958.62
CURRENT LIABILITIES	43551.19	49501.16	59683.21	27600.27
WORKING CAPITAL	-14058.36	-21330.56	-25899.20	13358.35
TOTAL ASSETS	132845.31	126431.11	147451.59	166977.61
RETAINED EARNINGS	594.53	-6398.64	-14518.12	-29859.06
EBIT	-4874.05	-4364.33	-5599.19	-3590.64
EBT	-7441.12	-6981.63	-8161.56	-5370.73
NP	-7453.01	-6992.92	-8116.56	-5378.78
MVE	51689.62	44693.63	62966.08	106625.51
TOTAL LIABILITES	81155.69	81737.48	84485.51	60352.10
RENENUE FROM OPERATIONS (TOTAL SALES)	17451.80	16809.22	19127.79	19343.60

Source: Bharat Sanchar Nigam Ltd. Annual report 2021-24

TABLE – 2.1a RESULTS OF ALTMAN MODIFIED Z-SCORE OF BSNL

YEAR	WCTA (X1)	RETA (X2)	EBITTA (X3)	MVETL (X4)	Z-SCORE
2021	-0.1058	0.0045	-0.0367	0.6369	-0.3
2022	-0.1687	-0.0506	-0.0345	0.5468	-0.9
2023	-0.1756	-0.0985	-0.0380	0.7453	-0.9
2024	0.0800	-0.1788	-0.0215	1.7667	1.7

Source: Computed by researcher from company annual reports (2021–2024)

TABLE – 2.2 DATA FOR ALTMAN Z-SCORE RELIANCE JIO INFOCOM LTD. (RJIL)

Particulars	2021	2022	2023	2024
CURRENT ASSETS	22435.00	28987.00	29720.00	33091.00
CURRENT LIABILITIES	30244.00	45503.00	64657.00	64996.00
WORKING CAPITAL	-7809.00	-16516.00	-34937.00	-31905.00
TOTAL ASSETS	250089.00	318489.00	445772.00	487405.00
RETAINED EARNINGS	12843.00	27160.00	45367.00	65833.00
EBIT	19927.00	24358.00	28488.00	31484.00
EBT	16087.00	19865.00	24429.00	27485.00
NP	12017.00	14817.00	18207.00	20372.00
MVE	182973.00	197790.00	215997.00	236369.00
TOTAL LIABILITES	67116.00	120699.00	229775.00	251036.00
RENENUE FROM OPERATIONS (TOTAL SALES)	69888.00	76977.00	90786.00	100119.00

Reliance Jio Infocomm Ltd. Annual report 2021-24

TABLE – 2.2a RESULTS OF ALTMAN MODIFIED Z-SCORE OF RJIL

YEAR	WCTA (X1)	RETA (X2)	EBITTA (X3)	MVETL (X4)	Z-SCORE
2021	-0.0312	0.0514	0.0797	2.7262	3.4
2022	-0.0519	0.0853	0.0765	1.6387	2.2
2023	-0.0784	0.1018	0.0639	0.9400	1.2
2024	-0.0655	0.1351	0.0646	0.9416	1.4

Source: Computed by researcher from company annual reports (2021–2024)

TABLE – 2.3 DATA FOR ALTMAN Z-SCORE BHARTI AIRTEL LTD. (BAL)

Particulars	2021	2022	2023	2024
CURRENT ASSETS	40071.90	37817.80	40577.00	38034.40
CURRENT LIABILITIES	71439.40	74484.20	78245.00	88290.80
WORKING CAPITAL	-31367.50	-36666.40	-37668.00	-50256.40
TOTAL ASSETS	277747.10	284854.50	335577.20	351813.30
RETAINED EARNINGS	20184.50	16230.00	14368.20	17065.00
EBIT	-6648.50	8965.10	15801.10	21521.50
EBT	-18465.20	-4255.70	1269.30	7116.10
NP	-25197.60	-3625.00	-89.60	4988.20
MVE	77360.10	78929.80	78993.40	100861.90
TOTAL LIABILITES	200387.00	205924.70	256583.80	250951.40
RENENUE FROM OPERATIONS (TOTAL SALES)	64325.90	70641.90	84720.10	94119.80

Source: Bharti Airtel Ltd. Annual report 2021-24

TABLE – 2.3a RESULTS OF ALTMAN MODIFIED Z-SCORE OF BAL

YEAR	WCTA (X1)	RETA (X2)	EBITTA (X3)	MVETL (X4)	Z-SCORE
2021	-0.1129	0.0727	-0.0239	0.3861	-0.3
2022	-0.1287	0.0570	0.0315	0.3833	0.0
2023	-0.1122	0.0428	0.0471	0.3079	0.0
2024	-0.1428	0.0485	0.0612	0.4019	0.1

Source: Computed by researcher from company annual reports (2021–2024)

TABLE – 2.4 DATA FOR ALTMAN Z-SCORE VODAFONE IDEA LTD.

Particulars	2021	2022	2023	2024
CURRENT ASSETS	18915.90	21357.50	18168.30	16629.00
CURRENT LIABILITIES	65872.30	60941.90	59929.30	54011.50
WORKING CAPITAL	-46956.40	-39584.40	-41761.00	-37382.50
TOTAL ASSETS	203131.40	193931.40	207273.10	185001.40
RETAINED EARNINGS	-148113.20	-176310.40	-205277.00	-236521.90
EBIT	-6219.30	-7326.50	-5815.60	-5406.70
EBT	-46314.50	-28237.20	-29307.80	-30414.20
NP	-46293.70	-28237.20	-29307.80	-31236.20
MVE	-37707.60	-61436.20	-73838.80	-103644.00
TOTAL LIABILITES	240839.00	255367.60	281111.90	288645.40
RENENUE FROM OPERATIONS (TOTAL SALES)	44715.00	38220.70	41917.10	42321.10

Source: Vodafone Idea Ltd., Annual report 2021-24

TABLE – 2.4a RESULTS OF ALTMAN MODIFIED Z-SCORE OF VIL

YEAR	WCTA (X1)	RETA (X2)	EBITTA (X3)	MVETL (X4)	Z-SCORE
2021	-0.2312	-0.7291	-0.0306	-0.1566	-4.3
2022	-0.2041	-0.9091	-0.0378	-0.2406	-4.8
2023	-0.2015	-0.9904	-0.0281	-0.2627	-5.0
2024	-0.2021	-1.2785	-0.0292	-0.3591	-6.1

Source: Computed by researcher from company annual reports (2021–2024)

TABLE-5 ALTMAN SCORE REMARKS

SITUATION	Z-SCORE	INDICATORS	REMARKS
1	Less than 1.1	Insolvent	Failed Firms (Distress Zone)
2	Between 1.1 & 2.6	Healthy	Grey (Zone of Ignorance)
3	2.6 & above	Secure	Non-Bankruptcy

Source: Altman Z-Score model

TABLE-6 DATA ANALYSIS ALTMAN SCORE RESULTBSNL

YEARS	Z- SCORE	INDICATOR	Average
2021	-0.3	Insolvent	-0.1
2022	-0.9	Insolvent	INSOLVENT
2023	-0.9	Insolvent	
2024	1.7	Healthy	

Source: Computed by researcher from company annual reports (2021–2024)

Interpretation:
Based on this classification, the following interpretation emerges:

- In 2021, the Z-Score of –0.3 places BSNL deep within the *distress zone*, indicating severe financial weakness. This suggests that the company was unable to cover its liabilities through existing assets and faced serious liquidity problems.
- In 2022, the Z-Score further deteriorated to –0.9, confirming a worsening financial position and a continuing state of insolvency risk.
- The score in 2023 remained at –0.9, showing continuous distress. This period reflects constant structural and operational inefficiencies, substantial debt servicing, and almost no profitability.
- In 2024, the Z-Score turns to be in favour to 1.7, shifting the firm from the *distress zone* to the *grey zone*. However this indicates a little recovery and, the company continues to be in below the safety threshold (2.6), but the risk of insolvency has not been fully eradicated.

During the period of four years, BSNL's financial health shows a gradual recovery symptoms but remains brittle. The continuous negative scores from 2021 to 2023 reflect continued financial distress and lack of efficiency. The minute improvement in 2024 reflects a sign of stability, however the firm remains at risk and requires strategic overhaul, debt elimination, and profitability augmentation to attain financial sustainability.

TABLE-7 DATA ANALYSIS ALTMAN SCORE RESULT RJIL

YEARS	Z- SCORE	INDICATOR	Average
2021	3.4	Healthy	2.05
2022	2.2	Healthy	
2023	1.2	Healthy	HEALTHY
2024	1.4	Healthy	

Source: Computed by researcher from company annual reports (2021–2024)

Interpretation:
Based on this classification, the interpretation is as follows:

- In 2021, the Z-Score was 3.4, places the company in the *safe zone*. This clearly reflects a strong financial standing, with high profitability, efficient asset utilization, and lower insolvency risk. The firm holds good liquidity and retained earnings.
- In 2022, the Z-Score slides to 2.2, shifting into the *grey zone*. This shows a moderate deterioration in financial well-being, perhaps due to rising liabilities, capital expansion costs, or lowered profit margins. Nevertheless still financially strong, the company's risk level had swallowed and signals close monitoring.
- In 2023, the Z-Score diminishes to 1.2, which is close to the *lower boundary of the grey zone*. The firm faced potential stress in meeting debt obligations and required strong financial management to take hold of slipping into the distress zone.
- In 2024, the Z-Score improved a bit to 1.4, reflecting a meagre recovery but still stands within the grey zone. The company shows a bit of improvement, may be through better management, but its financial health remained in question.

The overall performance from 2021 to 2024 proves a gradual decline in financial health, moving from a position of stability to a situation of financial risk. The improvement in 2024 reflects initial recovery, but regular cost control, and careful leverage management are necessary to accelerate financial strength and rejoice to the safe zone.

TABLE-8 DATA ANALYSIS ALTMAN SCORE RESULT BAL

YEARS	Z- SCORE	INDICATOR	Average
2021	-0.26	Insolvent	-0.1
2022	-0.04	Insolvent	
2023	0.04	Insolvent	INSOLVENT
2024	0.05	Insolvent	

Source: Computed by researcher from company annual reports (2021–2024)

Interpretation:
According to this classification:

- In 2021, the Z-Score of –0.26 put the company in the *distress zone*, reflecting serious financial vulnerability. The firm definitely suffered from lower earnings, high leverage, and adverse working capital.
- In 2022, the Z-Score climbed slightly to –0.04, but the company continues within the *distress zone*. This little improvement reflects marginal progress, though insolvency risk persisted.
- In 2023, the Z-Score achieved 0.04, reflecting stagnant but slightly positive movement. Despite the improvement, the company stays below the threshold of 1.1, indicating persistent financial stress and low profitability to support long-term solvency.

- In 2024, the Z-Score of 0.05 shows a very modest improvement, however the company still funtions in the *distress zone*. Though this positive trend shows a little stabilization, the overall financial position remains brittle and far from the safety zone.

During the four-year period, the company continuously stayed within the *distress zone*, reflecting persistent financial strain and potential insolvency risk. The profitability and liquidity are insufficient to secure financial health.
The firm necessitates strategic financial restructuring, absence of debt burdens, and development in operational efficiency to target the grey or safe zone. Continued revenue growth, improved cost management, and enhanced asset utilization will be vital to reinstate solvency and investor trust.

TABLE-9 DATA ANALYSIS ALTMAN SCORE RESULT VIL

YEARS	Z- SCORE	INDICATOR	Average
2021	-4.3	Insolvent	-5.0
2022	-4.8	Insolvent	
2023	-5.0	Insolvent	INSOLVENT
2024	-6.1	Insolvent	

Source: Computed by researcher from company annual reports (2021–2024)

Interpretation:
On the basis of these standards, the company is still in the distress zone for all four years, with a continuous trend of deterioration, as interpreted below:

- In 2021, the Z-Score of –4.3 already shows *severe financial distress*. The company faces significant losses, adverse retained earnings, and a highly leveraged capital structure. Liquidity issues and tons of debt obligations were obvious.
- In 2022, the Z-Score deteriorated to –4.8, showing deteriorating financial health. This weakening suggests that corrective actions—if taken—were

inadequate to offset consistent losses and swelling liabilities.
- In 2023, the Z-Score fell further to –5.0, signifying deepening insolvency risk. The company's inability to produce positive earnings before interest and taxes (EBIT) possibly contributed to constant erosion of net worth and equity.
- In 2024, the Z-Score touched –6.1, the lowest of the four years, confirming a serious state of financial instability. The firm was operating with extreme financial distress, characterized by

negative equity, heavy accumulated losses, and unsustainable debt levels.

Across the four-year period, Vodafone Idea Ltd. shows a consistently negative and deteriorating Z-Score trend, definitely placing it in the *distress zone*. This shows a very high likelihood of insolvency and serious financial weakness. The data disclose that the company is struggling to encounter its short-term and long-term liabilities, with declining profitability, wind-swept capital base, and swelling debt pressure. Immediate financial restructuring, capital infusion, and debt readjustment are essential to avert further deterioration. Strategic mergers, cost rationalization, and government support is critical to return to financial stability.

TABLE – 10 ALTMAN SCORE RESULT SAMPLED TELECOM COMPANIES

Z-Score & Ranking

SR. NO.	COMPANY	Z SCORE	INDICATOR	RANK
1	BSNL	-0.1	Insolvent	2nd
2	RJIL	2.05	Healthy	1st
3	BAL	-0.1	Insolvent	2nd
4	VIL	-5.0	Insolvent	3rd

Source: Computed by researcher from company annual reports (2021–2024)

Interpretation:
Table no.7 shows that the financial soundness of all four telecom companies according to Altman Z score. RJIL with Z-Score of 2.05 ranked top among other telecom companies whereas BSNL and BAL sharing the same Z-score of -0.1 and can be placed and 2nd position. VIL with Z-score of -0.5 is placed at 3rd position or technically at the last position.
RJIL is in Grey zone which means it is in Moderate position. The firm is financially stable but not completely risk-free. Needs close monitoring of leverage and profitability. BSNL is in Distress zone which depicts Very weak financial health. High chance of insolvency or continuing losses. Liquidity and profitability are likely poor. BAL is also in Distress zone which shows financial strain, possibly due to high debt or low profitability. Indicates potential financial distress. VIL is also in Distress zone (Severe) which shows Extremely poor financial condition. Indicates heavy debt burden and serious risk of default or insolvency.

IV. FINDING

The Altman Z-Score analysis has been applied to assess the financial health and bankruptcy risk of the Telecom companies India—BSNL, Reliance Jio Infocomm Ltd. (RJIL), Bharti Airtel Ltd. (BAL), and Vodafone Idea Ltd. (VIL). The results unveil substantial variation in the financial standing of these firms.

The final calculation of Z-Scores picture that BSNL (-0.1), BAL (-0.1), and VIL (-5.0) fall within the distress zone, which means acute financial weakness and a high probability of insolvency. The negative result of financial indicators highlight ongoing structural issues, especially mounting leverage, weakening earnings potential, and poor liquidity ratios. Such results are indicative of persistent weaknesses in the companies' financial performance and operational viability. The empirical evidence thus validates the likelihood of panicking financial distress in the absence of vigorous corrective actions, including all-inclusive organizational restructuring and major capital infusion. In nutshell, unless these corrective strategies are immediately addressed, all these three companies are prone to severe solvency challenges and potentially irreparable financial instability.

In contrast, RJIL (2.05) sits within the grey zone, illuminating a relatively bolder financial position compared to its competitors. While not completely risk-free, RJIL's score establishes reasonable stability, driven by strong revenue growth and market expansion.
Overall, the findings propose that the Indian telecom sector exhibits signs of financial weakness, with only RJIL managing to uphold a reasonably sustainable financial position. The results further highlight the call for improved cost management, debt restructuring,

and operational efficiency to augment the sector's financial resilience.

V. LIMITATION OF THE STUDY

1. Limited Scope of Variables: The Altman Z-Score model takes into consideration only a few financial ratios and may not fully capture the varied factors influencing a company's financial health, such as Government's regulatory policies, competition among companies and scientific and technological innovation.
2. Applicability to Service Sector: The original Altman model was meant for manufacturing companies. Application to telecommunication sector, which is service-oriented, may impact the correctness and reliability of the final results.
3. Dependence on Secondary Data: The study is based on published financial statements available in public domain, i.e., secondary data, which may contain errors or accounting adjustments that can impact the computed Z-Scores.
4. Macroeconomic and Policy Factors Ignored: External factors such as government policies, spectrum pricing, foreign players and economic fluctuations are not taken into consideration, although they significantly influence the telecom industry's financial condition.

VI. CONCLUSION

This study uses the Altman Z-Score model to predict the financial health and bankruptcy risk of four major companies in the Indian telecommunications sector: BSNL, Reliance Jio Infocomm Ltd. (RJIL), Bharti Airtel Ltd. (BAL), and Vodafone Idea Ltd. (VIL). The analyisi discloses substantial disparities in financial performance across these companies, with BSNL (-0.1), BAL (-0.1), and VIL (-5.0) classified in the distress zone, pointing very weak financial positions and high insolvency risk. These negative outcomes are ascribed primarily to continuous operational losses, high debt burdens, and lower liquidity. For these firms, immediate overhauling policy reforms, restructuring assets and liabilities, and better operational efficiency are necessary for survival and future feasibility.

On the contrary, RJIL, with a Z-score of 2.05, is situated in the grey zone, highlighting moderate financial stability. Although RJIL is not completely insulated from financial risk, it is relatively in better position due to low fixed costs, innovative pricing good marketing, use of modern technology and consistent revenue growth compared to its peers.

The analytical findings of this research display the presence of severe financial weakness within the Indian telecommunications industry, mainly due to factors such as price war, regulatory policies, and significant capital investment requirements. This underlines the urgent necessity for sector-wide financial restructuring, cost control strategies, and strategic policy interventions.

In summary, sound management of funds and credit is imperative for firms ambitious to advance their financial position. The study substantiate that the Altman Z-score can identify the undisclosed factors which drives the poor financial health among telecommunications companies.

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