

**A Study On Financial Performance Ranking Of Indian Information Technology (It)
Companies Using Topsis Method Leads To Corporate Reputation**

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Abstract

IT sector plays a vital role in strengthening the Indian economy. An accurate and proper Financial performance evaluation is required for companies to maintain the market position, protect their market share and for investors to take right investment decision. This paper aims measure and compare financial Reputation Ranking of 9 companies from Top 200 BSE Market Cap companies of Information Technology sector.

A multicriteria decision-making model to obtain a financial Reputation score by using Technique for Order Preference by Similarity to Ideal Solution Methods (TOPSIS). The Firms examined and assessed in terms of 12 financial parameters Net profit Margin, Return on Asset, Return on Equity, Earning Per Share, Total Asset, Liability, Book value, Current Ratio, Quick Ratio, Dividend Pay-out Ratio, Debt to Equity. The period for assessment of IT companies was from 2014 to 2018 and results show each year's company performance ranking.

The result showed that apart from 2015 in the year of 2014, 2016, 2017, 2018 Infosys has the Highest Financial Reputation ranking while in 2015 Oracle Finance service software ltd. Has the Highest Financial Reputation rank.

Keywords: Financial Performance Ranking, TOPSIS Method, Financial Ratios

1. INTRODUCTION

For the Information Technology (IT) industry India is the world's largest sourcing destination having approximately 67 per cent of the US\$ 124-130 billion market. The industry employs about 10 million workforces. Information Technology Industry led the economic transformation and change the perception of India in the global Economy. India's Cost competitiveness in providing IT services is 3-4 times inexpensive than US. India is also gaining importance in terms of intellectual capital with several global IT firms setting up their innovation centres in India. Financial analysis refers to an assessment of the profitability, stability and Liquidity of a business. The present paper attempts to measure the financial performances of selected Indian IT companies for the period 2014-2018

The paper is organized as follows: it presents a brief review of the literature dealing with the financial performance of the IT sector, followed by Methodology and Application, and finally, offers the Results & Conclusion.

2. LITERATURE REVIEW

This paper reviewed certain research papers available on Financial Ratios, Information Technology firm's Performance and TOPSIS, etc. They are narrated in a brief below:

(Feng, C.M., & Wang R.T, 2000) develop a performance evaluation model for Taiwanese domestic airlines that include the consideration of financial ratios. The TOPSIS method is used in conjunction to calculate performance scores of outranking five major airlines.

(Wang and Hsu Jo-Chien, 2004) targeted ten listing companies in the Taiwan stock market. they used the inventory turnover, net income ratio, earnings per share and current ratio these four financial ratios, by using the TOPSIS method to compute the relative performance index of each project and sort the results which help doing the investment strategic analysis.

(Bulgurcu, 2012) studied multicriteria decision-making model to compare the financial performance of thirteen technology firms of Istanbul Stock Exchange, it also compared the TOPSIS ranks with firm's market value. The Result showed Ranking results of TOPSIS and

Market Value do not have the similar ranking results of technology firms for 2009, 2010 and 2011 in Turkey.

(Demireli, 2010)obtained state-owned commercial bank'sperformance that extensively operate nationwide, Author used TOPSIS method in Turkey during the period of 2001-2007.

(Yalcin, N., Bayrakdaroglu A., & Kahraman C., 2012)suggesta performance evaluation approach and provide the rank to the companies of each sector in the Turkish manufacturing industry. The TOPSIS method can also cooperate with another multi-criteria decision-making model to evaluate the performances of the firms by using financial ratios. The results of TOPSIS model and hybrid models are comparable.

(Arab, R.O., Masoumi, S.S., & Barati, A., 2015)examined the financial performance of steel industry in India which is based on the stock exchange market in India. They chose five steel companies and ANOVA method used for sixteen financial ratios. As a result of the study all null hypotheses were rejected and showed significant difference in the financial performance of units in the steel industry.

(Gündoğdu, 2015)studied financial performance of foreign banks in turkey between 2003 to 2013 with the help of TOPSIS method to evaluate ten banks, the result is based upon sixteen criteria.The result showed that the Burgan bank and Turkland bank had the lowest financial performance rank while Deutsche bank had the highest performance rank.

(Akkoç S. & Vatansever K., 2013)studiedthe performance evaluation of 12 banks financial performance with the help of AHP and TOPSIS method. The results show both methods were given similar results.

(Yayar R. & Baykara H.V., 2012)studied efficiency and activity of banks in Turkey for the period of 2005-2011. Study said efficiency and activity are different concepts, for per period has been efficient score banks activityscores of located same years different series.

(Ross S, Westerfield R, & Jordan B, 2007)raised the concern about the financial ratios are divided into four groups like profitability, liquidity, solvency, Activity Ratios by most of the Researchers.

(A & Parray, 2012) explained the analysis of financial statement with the insights of Ratio analysis and common size statement analysis. The objective of this paper is to understand how the above-mentioned tools helpful to analyse the financial position of the company, Ranbaxy's balance sheet and income statement were analysed for the same.

(F & Ehrhardt, 2010) examined that to evaluate financial statement, financial ratios are helpful. For Planning and control tool, Financial Ratios can be used.

(Blajer-Gołębiewska & Arkadiusz, 2016) studied impact of the financial determinants on Corporate reputation, Result showed that financial determinant having weak effect or no effect on corporate reputation.

3. RESEARCH METHODOLOGY

As an approved variation of Multi-Criteria Analysis methods, this paper uses the TOPSIS method, which was developed by Hwang and Yoon in 1981. The TOPSIS is based on the rank of alternatives to obtain the best alternative selection, which is the closest to the ideal solution. In other words, the best alternative has the most distant solution from the anti-ideal solution. The TOPSIS method takes into consideration the distance from both sides. The process of the TOPSIS begins to make original data matrix by using criteria value for each alternatives. The TOPSIS transforms this original matrix into normalized matrix and it has five steps after these applications over matrix to determine the ranking of firms.

Step1: create the normalized decision matrix, The normalized value r_{ij} is calculated as follows:

$$R_{ij} = X_{ij}$$

$$r_{ij} = x_{ij} \sqrt{\sum_{i=1}^m x_{ij}^2} \quad i = 1, 2, \dots, m \text{ and } j = 1, 2, \dots, n.$$

$$rr_{ij} = x_{ij} \sqrt{\sum_{i=1}^m x_{ij}}$$

Step2: Compute the weighted normalized decision matrix, the weighted normalized value v_{ij} is calculated as follows:

$$v_{ij} = r_{ij} \times w_j, i = 1, 2, \dots, m \text{ and } j = 1, 2, \dots, n. \quad (1)$$

where w_j is the weight of the j^{th} criterion or attribute and $\sum_{j=1}^n w_j = 1$.

Step 3: Find the ideal (A^*) and negative ideal (A^-) solutions.

$$A^* = \{(\max_i v_{ij} \mid j \in C_b), (\min_i v_{ij} \mid j \in C_c)\} = \{v_j^* \mid j = 1, 2, \dots, m\} \quad (2)$$

$$A^- = \{(\min_i v_{ij} \mid j \in C_b), (\max_i v_{ij} \mid j \in C_c)\} = \{v_j^- \mid j = 1, 2, \dots, m\} \quad (3)$$

Step 4: Analyze the separation measures, the separation measures of each alternative from the positive ideal solution and the negative ideal solution, respectively, are as follows:

$$S_i^* = \sqrt{\sum_{j=1}^m (v_{ij} - v_j^*)^2}, j = 1, 2, \dots, m \quad (4)$$

$$S_i^- = \sqrt{\sum_{j=1}^m (v_{ij} - v_j^-)^2}, j = 1, 2, \dots, m \quad (5)$$

Step 5: Compute the relative closeness to the ideal solution. The relative closeness of the alternative A_i with respect to A^* is defined as follows:

$$RC_i^* = \frac{S_i^-}{S_i^* + S_i^-}, i = 1, 2, \dots, m \quad (6)$$

Step 6: Rank the preference order.

4. APPLICATION

In this paper, the financial data of nine Information Technology companies, which are listed on BSE for the period of 2014 to 2019. Data of 12 Financial parameters such as Net profit, Return on Asset, Return on Equity, Earning per share, Asset, Equity, Book value per share, Debt to Equity Ratio, Current Ratio, Quick Ratio, Dividend pay-out Ratio (F1,F2,.....,F12 in the same order) After this, the equal weights are given for each of ten criteria because ratios are of the same significance for this paper and linguistic variables are not used. Total of weights must be one. So, the equal weight for each one is determined as 0.0833333. Finally, by using the TOPSIS method, firm's financial ranking according to their financial performances is obtained. The financial parameter for 2014 in Table 1 are used for creating decision matrix.

Table 1. Original Data Matrix**2014**

Company Name	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
TechMahindra Ltd.	16.48	18.22	31.26	115.49	14739.20	233.50	367.82	4918.70	2.15	2.15	15.00	21.07
Mindtree Ltd.	14.88	21.48	27.49	108.50	2099.70	41.70	393.50	458.80	3.34	3.34	23.07	11.00
Wipro Ltd.	19.06	16.15	25.16	30.09	45736.90	493.20	119.04	16381.00	2.19	2.17	26.71	33.21
Infosys Ltd.	22.99	19.33	24.21	178.39	39237.00	286.00	735.87	10620.00	3.83	3.83	35.49	37.13
Tata Consultancy Services Ltd.	28.56	32.07	41.93	94.15	57604.19	195.87	224.90	13552.31	2.84	2.84	33.92	69.19
Oracle Financial Services Software Ltd.	36.34	11.75	13.58	136.56	9768.95	42.07	1004.81	1313.69	6.41	6.41	0.00	31.23
Mphasis Ltd.	16.78	4.75	5.78	10.62	4690.23	210.14	183.44	835.46	2.61	2.61	65.93	3.98
Larsen & Toubro Infotech Ltd.	19.45	36.04	61.51	280.08	2505.81	16.13	455.32	1037.40	1.76	1.76	61.05	64.31
HCL Technologies Ltd.	36.27	27.43	38.00	85.66	21814.50	140.00	224.94	6061.24	2.62	2.62	11.70	43.29

Table 2. Normalized Matrix**2014**

Company Name	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Tech Mahindra Ltd.	0.22	0.27	0.31	0.28	0.17	0.34	0.25	0.20	0.21	0.21	0.14	0.17
Mindtree Ltd.	0.20	0.31	0.27	0.26	0.02	0.06	0.27	0.02	0.33	0.33	0.21	0.09
Wipro Ltd.	0.26	0.24	0.25	0.07	0.52	0.71	0.08	0.65	0.22	0.22	0.24	0.27
Infosys Ltd.	0.31	0.28	0.24	0.43	0.45	0.41	0.50	0.42	0.38	0.38	0.32	0.30
Tata Consultancy Services Ltd.	0.39	0.47	0.42	0.23	0.65	0.28	0.15	0.54	0.28	0.28	0.31	0.57
Oracle Financial Services Software Ltd.	0.49	0.17	0.13	0.33	0.11	0.06	0.68	0.05	0.64	0.64	0.00	0.26
Mphasis Ltd.	0.23	0.07	0.06	0.03	0.05	0.30	0.12	0.03	0.26	0.26	0.60	0.03
Larsen & Toubro Infotech Ltd.	0.26	0.53	0.61	0.68	0.03	0.02	0.31	0.04	0.17	0.18	0.56	0.53
HCL Technologies Ltd.	0.49	0.40	0.38	0.21	0.25	0.20	0.15	0.24	0.26	0.26	0.11	0.36

After the original matrix is created, normalization Matrix is created by using the formula in first step of the TOPSIS method. Then, weighted normalized matrix is formed by multiplying each value with their weights.

Table 3. Weighted normalized Matrix**2014**

Company Name	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Tech Mahindra Ltd.	0.0185	0.0222	0.0258	0.0232	0.0139	0.0279	0.0207	0.0163	0.0178	0.0178	0.0114	0.0144
Mindtree Ltd.	0.0167	0.0262	0.0227	0.0218	0.0020	0.0050	0.0221	0.0015	0.0277	0.0277	0.0175	0.0075
Wipro Ltd.	0.0214	0.0197	0.0208	0.0061	0.0432	0.0590	0.0067	0.0544	0.0181	0.0180	0.0202	0.0227
Infosys Ltd.	0.0258	0.0236	0.0200	0.0359	0.0371	0.0342	0.0413	0.0353	0.0317	0.0317	0.0269	0.0254
Tata Consultancy Services Ltd.	0.0321	0.0391	0.0347	0.0190	0.0544	0.0234	0.0126	0.0450	0.0235	0.0235	0.0257	0.0473
Oracle Financial Services Software Ltd.	0.0408	0.0143	0.0112	0.0275	0.0092	0.0050	0.0565	0.0044	0.0531	0.0531	0.0000	0.0214
Mphasis Ltd.	0.0189	0.0058	0.0048	0.0021	0.0044	0.0251	0.0103	0.0028	0.0216	0.0216	0.0499	0.0027

Larsen & Toubro Infotech Ltd.	0.0219	0.0439	0.0508	0.0564	0.0024	0.0019	0.0256	0.0034	0.0146	0.0146	0.0462	0.0440
HCL Technologies Ltd.	0.0408	0.0334	0.0314	0.0172	0.0206	0.0167	0.0126	0.0201	0.0217	0.0217	0.0089	0.0296

After creating the weighted normalized table and ideal and negative ideal solution are determined by taking the maximum and the minimum values for each criterion.

Table 4. Positive and Negative Ideal Solution

2014

Company Name	S_{il}^*	S_{il}^-
Tech Mahindra Ltd.	0.010913523	0.004857214
Mindtree Ltd.	0.012095455	0.006399863
Wipro Ltd.	0.013536004	0.006479687
Infosys Ltd.	0.006250565	0.007402827
Tata Consultancy Services Ltd.	0.011162874	0.006677915
Oracle Financial Services Software Ltd.	0.011083315	0.010022044
Mphasis Ltd.	0.014761217	0.007808533
Larsen & Toubro Infotech Ltd.	0.011964933	0.011648398
HCL Technologies Ltd.	0.011594682	0.004549188

The same process for the year of 2014 and 2018 are carried out to obtain all steps of the TOPSIS method like the process in 2014.

Relative closeness calculation to ideal solution of the information technology firms is determined by the separation measures of each alternative from the positive ideal solution and the negative ideal

solution, respectively

Table 5. Performance Indexes

2014

RC_i^*

Rank

Tech Mahindra Ltd.	0.307989031	8
Mindtree Ltd.	0.346026129	5
Wipro Ltd.	0.323730357	7
Infosys Ltd.	0.542196918	1
Tata Consultancy Services Ltd.	0.374306044	4
Oracle Financial Services Software Ltd.	0.474857772	3
Mphasis Ltd.	0.345973398	6
Larsen & Toubro Infotech Ltd.	0.493297536	2
HCL Technologies Ltd.	0.281790411	9

Table 5. Performance Indexes

2015-2018

Company's Name	2015		2016		2017		2018	
	RC_i^*	Rank	RC_i^*	Rank	RC_i^*	Rank	RC_i^*	Rank
Tech Mahindra Ltd.	0.282851498	7	0.311713617	7	0.830827138	6	0.436529407	6
Mindtree Ltd.	0.300408999	5	0.315510833	6	0.817203016	7	0.424435775	8
Wipro Ltd.	0.250818904	9	0.245985311	9	0.809973395	8	0.433942437	7
Infosys Ltd.	0.447036404	2	0.598463148	1	0.926743672	1	0.626144442	1
Tata Consultancy Services Ltd.	0.286720302	6	0.478548429	3	0.911858697	2	0.52446835	2

Oracle Financial Services Software Ltd.	0.556904313	1	0.55713866	2	0.901599592	3	0.476571421	5
Mphasis Ltd.	0.279225486	8	0.356495075	5	0.875318125	4	0.491323899	3
Larsen & Toubro Infotech Ltd.	0.42906688	3	0.25832021	8	0.762776168	9	0.358701638	9
HCL Technologies Ltd.	0.347842873	4	0.378232215	4	0.866408923	5	0.476632283	4

The value is closer to the distance from Ideal solution and it is far from the negative ideal solution if the performance index value is higher, so that is best in financial reputation ranking. From the past 5 years(2014,2015,2016,2017,2018) apart from 2015 Infosys having the higher financial reputation as having 1st rank in TOPSIS method.

5. RESULT AND CONCLUSION

IT sector playing a vital role in Indian economy. The society's need for innovation which makes the IT sector more Important. According to the increasing sales and the needs of technology products, It is supposed that technology production will never seem to measured dejected.

In this study, multi-criteria decision-making method – TOPSIS is used for deciding the financial reputation of firms by using the financial parameters. The proposed method is used in determining the financial reputation ranking of the firms in the IT sector by comparing the firms according to the criteria determined for each year. It helps the firms to revise its financial reputation and analyse the best firm's financial situation.

In future studies, other multi-criteria methods can be used to evaluate the performances of IT firms with different weight calculation method. Furthermore, the TOPSIS method can be applied to evaluate the firms in other sectors. On the other hand, it is better to consider a greater number of criteria values and different weight calculation methods, and to develop hybrid methods to increase the power of evaluation of financial performance.

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