Comparative Performance Analysis of Nationalized Banks in India during2017- 18 using TOPSIS

G. Rajersh

Assistant Professor, Faculty of Management Studies, Loyola Institute of technology and

science, Thovalai, Kanyakumari, India

Jenifer. A

Process Associate

Aagna Global Solutions Pvt., LtdNagercoil, Kanyakumari, India

D. Amutha

Assistant Professor, Faculty of Management Studies, Loyola Institute of technology and

science, Thovalai, Kanyakumari, India

Abstract:

Banking being the primary sector of Indian economy now a day's drawn more attention and emphasized has given for the overall development in the nation. Public sector banks play a major role in the economic development by investing more in the field of infrastructure, basic services, and encouraging fair competition and laws in the business. It contributes a lot in reducing the inequality, and advanced in social well-being. The study analyses the financial performance of Indian banks with 4 parameters, such as Interest expended, Operating expenses, Total expenditure, and Bad loans in public sector banks using TOPSIS analysis. The analysis focus on the comparative performance of 19 Nationalized banks. The result of the study clearly indicates the ranking of the public sector bank by using the above parameters.

1. Introduction:

In India there are 19 nationalized banks operating in banking sector 2017-18 was a crucial year for the banks in India. Many monetary policies were introduced and public sector banks in India had to face lot of challenges. It reflected on the functioning and performance of such banks. A study has been made to analyze the performance of public sector banks in India. India is a nation with an enormous monetary structure portrayed by several financial organizations. Indian financial sector was well developed even before its freedom in 1947. In India, Reserve Bank of India (RBI) is entrusted with the accountability of monitoring and administration of banks under the Banking Regulation Act, 1949 (RBI, 2012). The BR Act also enables RBI to check licensing eligibilities of the banks, winding up and merger of banks as well as examination of banking companies and its books of accounts (RBI, 2012). In the 1960s banking business of India had turned into a vital device to support the improvement of the financial system.

Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) formed in the 1980s as a multi- criteriabased decision-making method. TOPSIS chooses the option of shortest the Euclidean distance from the ideal solution and greatest distance from the negative ideal solution. TOPSIS model is used for ranking the Indian Public sector Banks.

2. Review of literature

Indian banking sector is classified into many segments like public sector banks, private sector banks, and foreign banks. Public sector banks contributed banking sector in terms of supplying and borrowing funds through its various branches. Banking sector plays a major role in the upliftment of the country's economic development in finance and act as a pillar for success. We can develop various evaluation methods to evaluate the performance of various branches.

Banking system plays a major role in the money market in our country. In the competitive market field testing the performance the banking sector play a crucial role in the growth and sustainability. The productive measures taken by the banking sector will act as a performance indicator to know the growth level of any organisation. Banks have to take a proper initiative level to identify the suitable measures for further improvement. Considering various performance measures for selecting the best bank is listed below:

1. According to the current scenario the performance of banks is evaluated to know about the strength and weakness for taking suitable measures to make a place in the competitive financial sector.

2. The performance measured will plays a vital role for the bank manager to assign various task and also to make better plan.

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Bank managers are responsible for productivity and improvements in their respective banks.

Rezaei and Ketabi used AHP and TOPSIS analysis to rank the private banks in Iran. Authors first find the criteria and then develop weight factor using AHP. The weight factors by TOPSIS method are used to measure the performance and rank the Iranian private sector bank results found that Mellat Bank scored the highest Efficiency score of (CCi = 0.98) comparing all other banks in that region.

3. Research methodology

3.1 Data

The data used in this analysis for 19 nationalized public sector banks is a computed data in the year 2017-18. It is used to find the Comparative Performance and preference ranking for public sector banks in India during the period2017-18.

3.2 TOPSIS ANALYSIS

In general, the process for the TOPSIS algorithm starts with forming the decision matrix representing the satisfaction value of each criterion with each alternative. Next, the matrix is normalized with a desired normalizing scheme, and the values are multiplied by the criteria weights. Subsequently, the positive-ideal and negative-ideal solutions are calculated, and the distance of each alternative to these solutions is calculated with a distance measure. Finally, the alternatives are ranked based on their relative closeness to the ideal solution. The TOPSIS technique is helpful for decision makers to structure the problems to be solved, conduct analyses, comparisons and ranking of the alternatives. The classical TOPSIS method solves problems in which all decision data are known and represented by crisp numbers. Most real-world problems, however, have a more complicated structure. Based on the original TOPSIS method, many other extensions have been proposed, providing support for interval or fuzzy criteria, interval or fuzzy weights to modeled imprecision, uncertainty, lack of information or vagueness.

Application of TOPSIS method with crisp data in this Study

The TOPSIS process is carried out as follows - Suppose that there are *n* criteria $(C_1, C_2, ..., C_n)$ which are taken into consideration among *m* alternatives $(A_1, A_2, ..., A_m)$ in an MCDM problem. Let x_{ij} be the performance of the alternative *i* at the criterion *j*. The basic principle of the TOPSIS method is that the best alternative should have the shortest distance from the ideal solution and the farthest distance from the negative-ideal solution. Its procedure is as below.



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Calculate the normalized value n_{ii} . (1)

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \text{ for } i \in I = \{1, 2, \cdot, m\} \text{ and } j \in J = \{1, 2, \cdot, n\}.$$

The weightage assigned to each parameter as per discussion with the experts in this field. The weightage assigned foreach parameter is given below.

 V_{ij} .

- 1. Paid up Capital -2 weights.
- 2. Reserves and surplus -5 weights
- 3. Owned fund -5 weights
- 4. Deposits- 5 weights
- 5. Advances -3 weights
- 6. Investments 4weights
- 7. Interest Earned -5 weights
- 8. Total Income 5 weights

9. Interested Expended - 1 weights 10.Operating Expenses – 5 weights 11.Total Expenditure - 5 weights 12. Operating Profit - 10weights 13. Provisions and contingencies – 7 weights 14.Bad loans -20 weights 15. Net Profit -20 weights

(2) Calculate the weighted normalized value

 $v_{ii} = w_i n_{ii}, \forall i \in I, \forall j \in J.$

is the weight value of the j^{th} criterion, and $\sum_{j=1}^{n} j = 1$. Where w_i

Determine the positive-ideal solution A^+ (3) and the negative-ideal solution A^- . $A^{+}_{1} = \{(v^{+}, v^{+}, \cdot, v^{+})\} = \{(\max_{i} v_{i}, v^{+}_{i})\} = \{(\max_{i} v_{i}, v^{+}_{i}, v^{+}_{i})\}$ $j \in S \quad \underset{B}{),(\min v \quad j \in S} i \in S$

 $A^{-} = \{ (v^{-}, v^{-}, \cdot, v^{-}) \} = \{ (\min_{n} v \quad j \in S \quad j, (\max_{i} v \quad j \in S), (\max_{i} v \quad j \in S) \}$

 S_B and S_C denote the set of benefit criteria and set of cost criteria respectively. Where

(4) Calculate Euclidean distance.

$$d^{+} = i \qquad \bigwedge_{j \neq i}^{n} \sum_{j \neq i}^{n} (v_{i} - v_{j}^{+})^{2}, \forall i \in I.$$

$$d^{-} = i \qquad \bigwedge_{j \neq i}^{n} \sum_{j \neq i}^{n} (v_{i} - v_{j}^{-})^{2}, \forall i \in I.$$

Calculate the relative closeness to the ideal solution. (5)

$$R_i = \underbrace{d^-}_{i}_{i}, \text{ for } i \in I.$$

(6) Rank the preference order.

For ranking alternatives by using this index, we can choose the best alternative with the maximum value of relative closeness. Here, out of 15 parameters 4 parameters, such as 1. Interest expended. 2. Operating expenses. 3. Total expenditure 4. Bad loans are ranked from least to highest.

4. APPLICATION OF TOPSIS FOR ANALYSIS

In order to analyze the performance of public sector banks in India during 2017-18 the TOPSIS process carriedout as below.

4.1 Relative Closeness to Ideal solution

The study analyses the financial performance of Indian banks with 4 parameters, such as Interest expended, Operating expenses, Total expenditure, and Bad loans in public sector banks using TOPSIS analysis.

S. No	Name of the Bank	Si+	Si-	Σ	Performance
1	Allahabad Bank	0.12316	0.08115	0.20431	0.39717
2	Andhra Bank	0.09382	0.09886	0.19268	0.51306
3	Bank of Baroda	0.07307	0.12286	0.19593	0.62707
4	Bank of India	0.09391	0.08886	0.18277	0.48617
5	Bank of Maharashtra	0.08016	0.12424	0.20440	0.60782
6	Canara Bank	0.07123	0.11239	0.18362	0.61207
7	Central Bank of India	0.08983	0.09557	0.18539	0.51547
8	Corporation Bank	0.08082	0.10893	0.18975	0.57406
9	Dena Bank	0.07582	0.12797	0.20378	0.62795
10	Indian Bank	0.05258	0.15669	0.20927	0.74873
11	Indian Overseas Bank	0.09937	0.09680	0.19617	0.49346
12	Oriental Bank of Commerce	0.09140	0.10050	0.19189	0.52371
13	Punjab and Sind Bank	0.07149	0.14161	0.21310	0.66451
14	Punjab National Bank	0.14012	0.10142	0.24154	0.41990
15	Syndicate Bank	0.06772	0.12612	0.19383	0.65064
16	UCO Bank	0.08468	0.11746	0.20214	0.58108
17	Union Bank of India	0.07352	0.12023	0.19376	0.62054
18	United Bank of India	0.06915	0.14588	0.21503	0.67843
19	Vijaya Bank	0.05746	0.16310	0.22055	0.73949

Table 4.1 Relative Closeness to Ideal solution.

The result is shown in the above table 3.1. Based on the calculation using the selected parameters in the public sector bank performance of Indian bank scored 0.74873 and Vijaya bank scored 0.73949 respectively.

4.2 Rank Preference

The rank of the public sector banks has given based on the value obtained from relative closeness to ideal solution.

S. No	Name of the Bank	Rank
1	Indian Bank	1
2	Vijaya Bank	2
3	United Bank of India	3
4	Punjab and Sind Bank	4
5	Syndicate Bank	5
6	Dena Bank	6
7	Bank of Baroda	7
8	Union Bank of India	8
9	Canara Bank	9
10	Bank of Maharashtra	10
11	UCO Bank	11
12	Corporation Bank	12
13	Oriental Bank of Commerce	13
14	Central Bank of India	14
15	Andhra Bank	15
16	Indian Overseas Bank	16
17	Bank of India	17
18	Punjab National Bank	18
19	Allahabad Bank	19

Table 4.2 Ranking of public sector banks

The study is based on the TOPSIS analysis for 19 nationalized banks in India during the period 2017-2018. It is stated that Indian Bank and Vijaya Bank ranked first and second respectively followed by United Bank of India. Out of 19 public sector banks Indian Bank performed better on basis of TOPSIS analysis.

4. Conclusion

Based on the TOPSIS analysis it is concluded that in India during 2017-18 among all the 19 nationalized banks, Indian Bank and Vijaya Bank ranked first and second respectively followed by United Bank of India. The end result is based on the weight assigned and changes might be noticed in the position when weights assigned differ. It is concluded that the nationalized bank should concentrate on loan payment to improve their performance in financial sector. The banks should execute new banking services like ATM facilities, e- banking, issue a greater number of credit cards, new banking schemes for client to create themselves competitive in market.

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40. Application of TOPSIS Technique for FinancialPerformance...prof.mau.ac.ir/images/Uploaded_files/topsis [5388009] financial performance score by using Technique for Order Preference by Similarity to Ideal Solution Methods (TOPSIS). TOPSIS helps to rank these firms for three-year time period between 2009 and 2011. This study will find out whether the ranking results of TOPSIS and the ranking results of the firms in question overlap or not.

41. THE ROLE OF TOPSIS METHOD ON DETERMINING THE FINANCIAL ...ijeronline.com/documents/volumes/2015/Vol 6 Iss 03 MJ... In his study in which 2009-2011 financial rates of technology firms that are publicly traded in The Borsa Istanbul have been examined, Bulgurcu (2012) has tested if market values and rankings of the firms match by using TOPSIS method. It is found out that ranking that is done via TOPSIS method and market value does not match.

42. A TOPSIS Approach to Evaluate the Financial Performance of ...iosrjournals.org/iosr-jbm/papers/Vol21-issue1/Series-2/E...assessed with a view to explore the financial soundness of the banks using the multiple criteria decision - making approach (TOPSIS). A total of 40 Scheduled Commercial Banks were selected on the basis of the advances provided, amounting to a minimum of Rs.1,500 billions as on 31-03-2014. The study covered a period

43. Evaluation of financial performance of paper companies traded ...dergipark.gov.tr/download/articlefile/446469TOPSIS method is a technique used by the most of the researchers in performance evaluation studies. Feng, C.

M. and Wang, R. T. (2000) used a TOPSIS method in a study using various financial ratios and conducted a financial performance evaluation of Taiwan's five major airlines. In a study by Cakir, S., and Perçin, S.,

44. Financial inclusion in India: an application of TOPSIS ...emeraldinsight.com/doi/abs/10.1108/H-09-2015-0061 Data for the study were collected from secondary sources published by Reserve Bank of India (RBI) and Central Statistical Organization. Applying technique of order preference by similarity to ideal solution (TOPSIS), a composite multidimensional index of financial inclusion (IFI) has been built by using three broad parameters of penetration, availability and usage of banking services.

45. Financial Ratio and Performance Airlines Industry with DEA ...acadpubl.eu/jsi/2018-119-10/articles/10a/34.pdfThis study relates to the analysis of the company's financial performance ratio on the airline industry operating in Indonesia using 4 items in the company's financial statements such as revenues, net income, total assets and total equity. From the 4 items in this financial statement, we will analyze the model using DEA and TOPSIS method.

46. Comparative studies on using RSM and TOPSIS methods to ...www.sciencedirect.com/science/article/abs/pii/S... Two optimization methods were adopted in this study, one is the response surface methodology (RSM), and the other is the technique for order preferences by similarity to an ideal solution (TOPSIS) method. The objective of this study was to compare the pros and cons of these two methods.

47. Application of TOPSIS Technique for Financial Performance ...www.sciencedirect.com/science/article/pii/S... According to financial performances and they should use multi-lateral ways. As a multi-lateral way, this paper applies Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method to evaluate financial performance of thirteen technology firms with calculated financial ratios by using financial statements.

48. The Preliminary Study of Applying TOPSIS Method to Assess an ...www.sciepub.com/JBMS/abstract/8852 Using TOPSIS method as based on financial and nonfinancial information of ten consecutive years for an elderly caring center to examine past performance and systematically exploring alternative ways to make better-informed decisions in the future.

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