Evaluation of Mutual funds Using TOPSIS Method

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Abstract. Particularly in the final two decades of the 20th century, the mutual fund business has experienced exponential growth. Accurate financial performance ratings allow for comparisons between investment managers and make it easier for average investors to choose top managers. Fund managers must put in more effort to please investors and management as a result of increased market competitiveness. Therefore, it is important for both fund managers and investors to regularly evaluate the performance of mutual funds. According to the most recent data, this sector has 6.8 trillion rupees in assets under administration. More than a thousand mutual fund plans are currently available on the Indian market, and some of them offer higher returns than others. to evaluate the performance of mutual funds that are equity-based In writing this article, an effort was made. Between April 1997 and April 2012, 45 projects from two private and two public sector organizations were examined (15 years). Analysis was conducted utilizing the capital asset pricing model and the risk-return relationship (CAPM). The top performers, according to the total analysis, are HDFC and ICICI, followed by UTI and LIC, who perform the worst. This resulted in a reduced predicted return in the risk-return relationship. The results also show that some programs do not perform well; these projects faced the problem of diversification. In the MCDM TOPSIS method, the Top 100 fund is the worst scheme in the data set, and in the data set Sensex plan is the best scheme.
Key words: Renewable Energy, Multi-attribute decision-making, fuzzy logic processing, MCDM

1. Introduction

Performance appraisal of investment projects has become a critically essential topic with the rise in the popularity of mutual funds. A powerful tool for researchers to test the efficient market hypothesis is the systematic evaluation of fund performance, which enables peer comparison among investment managers, aids average investors in spotting talented managers, helps managers monitor behavior effectively, and facilitates peer comparison among investment managers. Particularly in the final two decades of the 20th century, the mutual fund business has experienced exponential growth. The business underwent a structural change from a public sector monopoly to a monopolistic industry as a result of the arrival of private mutual funds (since 1993). Confusion is eliminated by a methodical evaluation approach, which also assists small investors in choosing how much to invest in various mutual fund schemes. Fund managers must put in more effort to please investors and management as a result of increased market competitiveness. Therefore, it is important for both fund managers and investors to regularly evaluate the performance of mutual funds. A mutual fund is a professionally managed collective investment scheme that allows many participants to invest in securities such as stocks, bonds, short-term money market instruments, and other types of investments. Mutual funds are preferred by investors for a variety of reasons. One method of investing is to purchase equities directly from the market. however, ascertain the performance of the business being purchased. It takes time to research the history of bonus payments to comprehend the company's potential for future business success, the promoter's track record, and the dividend. Before investing, a person should complete their study. However, for many stock market investors It takes time and effort to gather a lot of information before investing. Investors like the mutual fund route as a result. They accept the responsibility of investing in shares and invest in a mutual fund scheme that is stocks after conducting adequate analysis and study. An investor doesn't need to bother about studying hundreds of stocks. The mutual fund and its qualified fund management staff are in charge. India's history with mutual funds dates back to 1963 when UTI was created by a parliamentary act. There were 1292 mutual fund schemes in India as of April 30, 2012, with a total market value of Rs. 6,80,154 crores (also known as assets under management). In this situation, the average person still has no idea how mutual fund schemes work. And studying behavior becomes pertinent. One of the greatest ways to evaluate the performance of a mutual fund is to look at the risk-return relationship.

Unconditional techniques cannot change the timing of expected returns. These activities are systematic of a fund Assumes risk is constant over time; As a result, it disregards the timetables of fund managers. Beta (systematic risk) is not time-invariant in actively managed funds due to time variation. time-related factors, alterations in market prices, and due to significant variations in fund inflows and outflows beyond the fund manager's control This might alter when the portfolio changes. Fresh details about the economy in general and/or a specific company, as well as the relative risk of the company; that, in turn, can change their expected income. Investor expectations and volatility of financial instruments it is acknowledged in the finance literature that time varies (Coggins et al., 2004). The risk exposures of the Fund Manager and associated market premiums fluctuate throughout time in line with the status of the economy under the conditional performance appraisal technique. Consequently, the time variation of investment risk should be taken into account while evaluating the performance of funds (Merton, 1971). This idea inspired other new models for conditional performance evaluation. This implies that the funds' estimated return and risk will change over time. The state of the economy is

predetermined and is measured using variables related to public information. Conditional alpha is a performance indicator. The excess returns of a fund and based on known information variables the strategy's attempt to mirror the fund's long-term risk dynamics sets it apart from other approaches. Evaluation of Conditional Performance broadly complies with the semi-strong form3 of market efficiency (Fama, 1970). A fund manager cannot increase the value of equities using a machine trading method if the market is efficient. To add value and generate positive conditional alpha, the Manager should provide higher returns than the machine trading strategy. Ferson and Schott (1996) by using historical average returns to estimate expected performance to avoid induced bias, they use performance measures conditional on public information variables. by employing lucrative investment managers that rely on available information Not the best performance, in my opinion. Consequently, conventional performance metrics presume constant risk; Based on general information only A strategy can be assigned extraordinary performance. Public information is a linear function of mutual fund beta, and it is a temporal lag brought on by macroeconomic factors. They suggest only a few performance metrics.

A businessman, invests his funds, the MCDM method can be followed to estimate the financial commission of the bank And it can be termed as the best performing bank. MCDM is for improving disadvantages and is a well-defined tool, which compares a establishment's arrangement to that of industry leaders, Determines the methods used by market chiefs to reach their performance levels, To improve its performance Uses this understanding judiciously. Net Profit Ratio Ratio, Like the long-term finance rate Under the multiple criteria decision-making (MCDM) model Using various financial indicators, List numerous Indian private sector banks To regard mutual replacement performance In this study, an endeavor maintains been made. Giving gratitude to private sector banks has two main goals: first, it sets a standard for additional banks to aspire to, and second, it prompts investors to pool their money in mutual funds with the best banks.

2. Mutual Funds

A mutual fund sells shares to the public A trust, like any other company, sells shares of the fund to raise funds from investors. Money is raised in stocks, bonds, money markets, and commodities Used in various bonds. Each mutual fund has similar financial goals. And the funds are invested following the goal and to implement the investment strategy of a Fund Also responsible for managing its portfolio trading activities By a professional financial manager This fund is managed. Every investor in a mutual fund, share the profit or loss of the fund proportionately (based on the total number of owned shares). Any investor can diversify their portfolio by investing a little amount in several industries depending on their interests and risk tolerance. An empirical study on the conditional performance of Indian mutual funds using the unconditional and conditional models from ICICI, HDFC, LIC, and UFI was undertaken by Roy et al. in 2003. The performance of numerous mutual funds is evaluated in this research. In the assessment of the performance of mutual fund managers In the Indian context, the impact of including lagged informative data is examined. Using lagged information variables as a condition Enhances mutual fund scheme performance. Gaining the confidence of investors is crucial for success in the mutual fund sector. To strengthen investors' confidence in investing in mutual funds, Transparency in services to them, tax incentives, Minimum Guaranteed Income, Provide consistency in performance, etc. Based on qualification, occupation, and family annual income the study reveals the key factors. To invest in mutual funds returning the investor's confidence is a minimum guaranteed return followed by transparency and Stability. It attracts investors to invest in mutual funds various mutual fund schemes have many features. These features are their past performance, Record of Past Dividends, Could be the stability of income, etc. From the rankings assigned by investors, past performance is the most important factor that attracts investors when choosing a mutual fund scheme. Recently mutual fund companies, the entry burden for investing in mutual fund schemes have been removed. Most of the respondents are mutual funds and the survey revealed that there is some influence on investing in Systematic Investment Plans (SIP). There are only those who are greatly affected by the removal of the entry load. Before most investors invest in mutual funds they evaluate their performance. There are several methods for evaluating the performance of different mutual fund schemes. According to the survey, the majority of the respondents, As a benchmark for evaluating the performance of mutual fund schemes, The absolute return of funds is higher than the returns of other similar schemes, And want to withdraw funds. Less preferred to evaluate the performance of any fund The study also reveals that fund returns to benchmark market index returns. a set of data used to assess the effectiveness of Indian mutual funds This section provides examples. Additionally, a thorough discussion is made of the methods utilized to arrive at the final performance evaluation results. Additionally, for the readers' better understanding, the variables employed are explained along with their significance to the mutual fund sector.

The beta of any asset is calculated in the capital asset pricing model to determine its risk. It gauges an asset's risk concerning the market. A project is considered to be riskier than the market index if its beta value is greater than unity. Only one scheme, UTI's banking sector fund, has a higher beta in this review of 12 projects. It was 9% higher despite the high-risk factor. The beta risk metric for an asset and we determine the anticipated rate of return for a mutual fund scheme after determining the market index's yearly growth rate. Study period: 1997 to 2012. 45 share-based mutual fund schemes in total are taken into account. Ten of the twelve, including LIC and UTI, are owned by PSUs. The remainder is in the private sector and is owned by ICICI and HDFC. The study employed NIFTY and SENSEX, the benchmark stock indices, as well as the daily closing net asset values (NAV) of mutual funds to measure risk. The study's core idea is to estimate a project's expected return (risk-adjusted), compare that estimate to the project's actual rate of return over time.

3. TOPSIS Method

Multi-Criteria Decision Making (MCTM) is it is Fast in many fields A growing problem One of the area. A set of alternatives based on multiple criteria, How to evaluate them is the central problem. This problem is practical although very relevant, there are some methods and their quality is difficult to judge. In multi-criteria decision-making models, simultaneously for optimization, several Target accounts are taken. A measure for each objective is for other objectives Size may vary. For example, an objective might be to improve profitability, Which is measured by monetary units, Also reducing manpower time Could be a purpose. On the other hand, these objectives sometimes contradict each other And are not all in the same direction. In this field, More reasonable programming is better decision-making. Multi-criteria decision-making models in this paper Due to their importance and their application, explanations are given below. The most appropriate Based on n decision criteria Existing alternatives Alternative prioritization or selection techniques and Multi-criteria decision-making of decision-making methods common to the group. Multiple criteria to aid selection in situations there are various multi-criteria techniques. The acronym TOPSIS stands for Optimal Solution by analogy indicates a prioritization technique. TOPSIS was originally proposed by Hwang and Yoon, TOPSIS is attractive because the decision-makers Require limited subjective input. Subjectivity to weights Only input is required. This method is of three types of Attributes or criteria that include: Qualitative Benefit Attributes/Quantitative Benefit Attributes Cost attributes In this method, two synthetic alternatives are considered. Best Alternative: There is an optimal condition for all attributes considered. Negative Best Alternative: One with poor attribute values. TOPSIS is from a great point at the same time shortening the distance, also based on maximizing distance from a nadir point. MCDM is from finite alternatives a method for finding solutions. TOPSIS is of criterion importance Relative weights can be combined. This time suppose we have m alternatives (options) and n attributes/criteria, And for every wish, Each criterion will have a score Based on the stated principles, In this manner, from the ideal point The distance of an alternative is taken into account and From the negative ideal point, Its distance is also taken into account. From the selected alternative optimal solution must have a very short distance, at the same time from the negative solution there must be a great distance. Table 1 is given for an evaluation parameter.

TABLE 1. Given evaluation parameter

C1	risk factor(beta)
C2	annual return on market
C3	expected rate of return
C4	actual rate of return

TABLE 2. Data Set for Economic feasibility TOPSIS method

	growth fund
HDFC 2	children fund
HDFC 3	sensex plan
ICICI 1	dynamic plan
ICICI 2	banking and financial
ICICI 3	services industries fund
UTI 1	UTI top 100
UTI 2	banking sector fund
UTI 3	equity fund
LIC 1	top 100 fund
LIC 2	tax plan
LIC 3	sensex advantage growth

Table 2 shows the alternatives (schemes) growth fund is HDFC 1, the children fund is HDFC 2, the Sensex plan is HDFC 3, the dynamic plan is ICICI 1, the banking and financial is ICICI 2, services industries fund is ICICI 3, UTI top 100 is UTI 1, banking sector fund is UTI 2, equity fund is UTI 3, top 100 funds is LIC 1, the tax plan is LIC 2, Sensex advantage growth is LIC 3.

TABLE 3. Data set for mutual fund TOPSIS method

	C1	**C2**	**C3**	**C4**
HDFC 1	0.79	18.77	10.51	26.52
HDFC 2	0.36	18.35	11.73	14.88
HDFC 3	0.95	18.32	17.80	30.47
ICICI 1	0.75	20.14	17.11	27.52
ICICI 2	0.93	5.74	5.90	16.69
ICICI 3	0.82	10.70	10.19	8.14
UTI 1	0.83	5.24	5.71	6.43
UTI 2	1.02	4.98	4.92	14.00
UTI 3	0.69	4.85	5.83	11.45
LIC 1	0.93	12.59	12.27	6.67
LIC 2	0.85	12.85	12.12	8.09
LIC 3	0.85	5.43	5.82	0.01

Table 3 shows the Data set of the growth fund, children fund, Sensex plan, dynamic plan, banking and financial, services industries fund, UTI top 100, banking sector fund, equity fund, top 100 funds, tax plan, Sensex advantage growth of the C1, C2, C3, C4, C5.
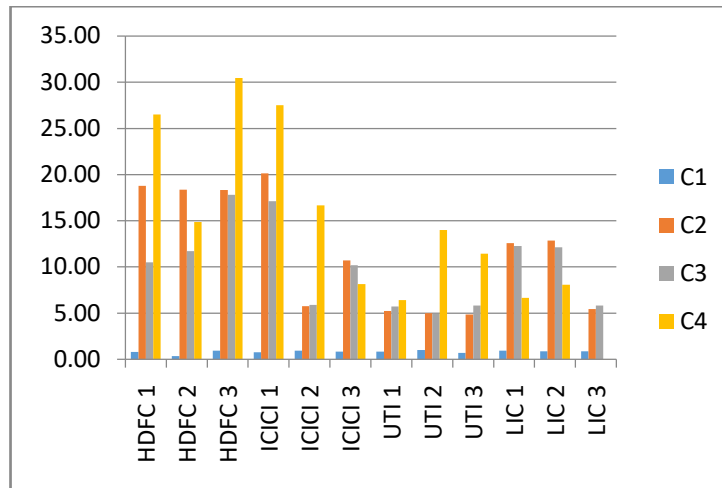

FIGURE 1 data set graph

Figure 1 shows that the Data set of the growth fund, children fund, Sensex plan, dynamic plan, banking and financial, services industries fund, UTI top 100, banking sector fund, equity fund, top 100 funds, tax plan, Sensex advantage growth of the C1, C2, C3, C4, C5. HDFC Is Give High Values and UTI & LIC are low values.

TABLE 4. Normalized Data

	C1	**C2**	**C3**	**C4**
HDFC 1	0.2747	0.4190	0.2790	0.4526
HDFC 2	0.1252	0.4096	0.3114	0.2539
HDFC 3	0.3303	0.4090	0.4728	0.5200
ICICI 1	0.2608	0.4496	0.4542	0.4696
ICICI 2	0.3234	0.1281	0.1566	0.2848
ICICI 3	0.2851	0.2389	0.2706	0.1389
UTI 1	0.2886	0.1170	0.1516	0.1097
UTI 2	0.3547	0.1112	0.1306	0.2389
UTI 3	0.2399	0.1083	0.1547	0.1954
LIC 1	0.3234	0.2811	0.3258	0.1138
LIC 2	0.2956	0.2869	0.3219	0.1381
LIC 3	0.2956	0.1212	0.1544	0.0002

Table 4 shows the data from which the normalized data is calculated from the data set value divided by the sum of the square root of the column value. It is the Normalization of the Data set of the growth fund, children fund, Sensex plan, dynamic plan, banking and financial, services industries fund, UTI top 100, banking sector fund, equity fund, top 100 funds, tax plan, Sensex advantage growth of the C1, C2, C3,C4, C5.
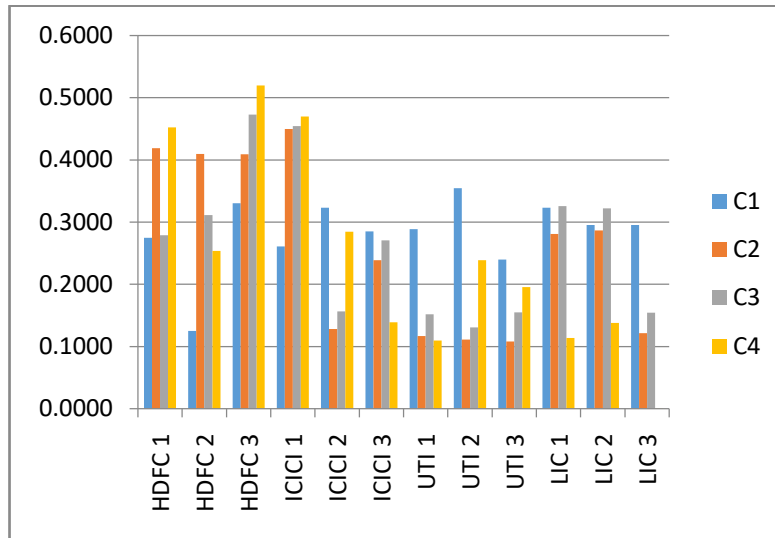

FIGURE 2. Normalized Data

Figure 2 shows the data from which the normalized data is calculated from the data set value is divided by the sum of the square root of the column value. It is the Normalization of Data set of the growth fund, children fund, sensex plan, dynamic plan, banking and financial, services industries fund, UTI top 100, banking sector fund, equity fund, top 100 fund, tax plan, sensex advantage growth of C1,C2,C3,C4,C5.

TABLE 5. Weight

	C1	C2	C3	C4
HDFC 1	0.25	0.25	0.25	0.25
HDFC 2	0.25	0.25	0.25	0.25
HDFC 3	0.25	0.25	0.25	0.25
ICICI 1	0.25	0.25	0.25	0.25
ICICI 2	0.25	0.25	0.25	0.25
ICICI 3	0.25	0.25	0.25	0.25
UTI 1	0.25	0.25	0.25	0.25
UTI 2	0.25	0.25	0.25	0.25
UTI 3	0.25	0.25	0.25	0.25
LIC 1	0.25	0.25	0.25	0.25
LIC 2	0.25	0.25	0.25	0.25
LIC 3	0.25	0.25	0.25	0.25

Table 3 shows the weight of the data set the weight is equal for all the value in the set of data in the table 1. The weight is multiplied with the previous table to get the next value.

TABLE 6. Weighted normalized decision matrix

|	C1	C2	C3	C4
HDFC 1	0.0687	0.1048	0.0698	0.1131
HDFC 2	0.0313	0.1024	0.0778	0.0635
HDFC 3	0.0826	0.1022	0.1182	0.1300
ICICI 1	0.0652	0.1124	0.1136	0.1174
ICICI 2	0.0808	0.0320	0.0392	0.0712
ICICI 3	0.0713	0.0597	0.0676	0.0347
UTI 1	0.0721	0.0292	0.0379	0.0274
UTI 2	0.0887	0.0278	0.0327	0.0597
UTI 3	0.0600	0.0271	0.0387	0.0488
LIC 1	0.0808	0.0703	0.0814	0.0285
LIC 2	0.0739	0.0717	0.0805	0.0345
LIC 3	0.0739	0.0303	0.0386	0.0000
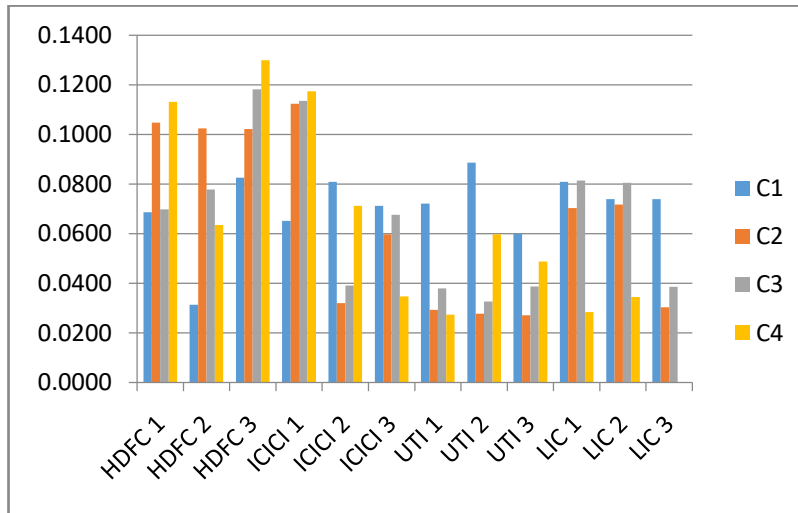
FIGURE 3 . Weighted normalized decision matrix

Figure 3 shows the growth fund, children fund, sensex plan, dynamic plan, banking and financial, services industries fund, UTI top 100, banking sector fund, equity fund, top 100 fund, tax plan, sensex advantage growth of the C1,C2,C3,C4,C5.

TABLE 7. Positive Matrix

	C1	C2	C3	C4
HDFC 1	0.0887	0.1124	0.1182	0.0000
HDFC 2	0.0887	0.1124	0.1182	0.0000
HDFC 3	0.0887	0.1124	0.1182	0.0000
ICICI 1	0.0887	0.1124	0.1182	0.0000
ICICI 2	0.0887	0.1124	0.1182	0.0000
ICICI 3	0.0887	0.1124	0.1182	0.0000
UTI 1	0.0887	0.1124	0.1182	0.0000
UTI 2	0.0887	0.1124	0.1182	0.0000
UTI 3	0.0887	0.1124	0.1182	0.0000
LIC 1	0.0887	0.1124	0.1182	0.0000
LIC 2	0.0887	0.1124	0.1182	0.0000
LIC 3	0.0887	0.1124	0.1182	0.0000

Table 5 shows the positive matrix of the data set that is calculated from the weighted normalized result matrix by calculating the maximum and minimum of the benefit factor and the cost factor.

TABLE 8. Negative matrix

	C1	C2	C3	C4
HDFC 1	0.0313	0.0271	0.0327	0.1300
HDFC 2	0.0313	0.0271	0.0327	0.1300
HDFC 3	0.0313	0.0271	0.0327	0.1300
ICICI 1	0.0313	0.0271	0.0327	0.1300
ICICI 2	0.0313	0.0271	0.0327	0.1300
ICICI 3	0.0313	0.0271	0.0327	0.1300
UTI 1	0.0313	0.0271	0.0327	0.1300
UTI 2	0.0313	0.0271	0.0327	0.1300
UTI 3	0.0313	0.0271	0.0327	0.1300
LIC 1	0.0313	0.0271	0.0327	0.1300
LIC 2	0.0313	0.0271	0.0327	0.1300
LIC 3	0.0313	0.0271	0.0327	0.1300

Table 6 shows the negative matrix of the data set that is calculated from the weighted normalized result matrix by calculating the minimum and maximum of the benefit factor and the cost factor.

TABLE 9. SI plus, SI Negative, Ci

	SI Plus	Si Negative	Ci
HDFC 1	0.115	0.088	0.433
HDFC 2	0.086	0.101	0.539
HDFC 3	0.13	0.091	0.411
ICICI 1	0.12	0.093	0.436
ICICI 2	0.108	0.077	0.417
ICICI 3	0.065	0.108	0.624
UTI 1	0.089	0.110	0.553
UTI 2	0.104	0.091	0.467
UTI 3	0.102	0.086	0.457
LIC 1	0.051	0.121	0.702
LIC 2	0.055	0.114	0.673
LIC 3	0.083	0.137	0.621

Table 7 show the sum of the calculation positive and negative matrix, the Si plus is calculated from the positive matrix, Si negative is calculated from the negative matrix and the Ci is calculated from the sum of the Si plus and Si negative.

TABLE 10. Rank for mutual fund TOPSIS method

	Rank
HDFC 1	10
HDFC 2	6
HDFC 3	12
ICICI 1	9
ICICI 2	11
ICICI 3	3
UTI 1	5
UTI 2	7
UTI 3	8
LIC 1	1
LIC 2	2
LIC 3	4

Table 8 shows the LIC 1 is on 1st rank, LIC 2 is on 2rd rank, ICICI 3is on 3nd rank, LIC 3 is on 4th rank, UTI 1 is on 5th rank, HDFC 2 is on 6th rank, UTI 2 is on 7th rank, UTI 3 is on 8rd rank ICICI 1 is on 9th rank, HDFC 1 is on 10th rank, ICICI 2 is on 11th rank HDFC 3 is on 10th rank.
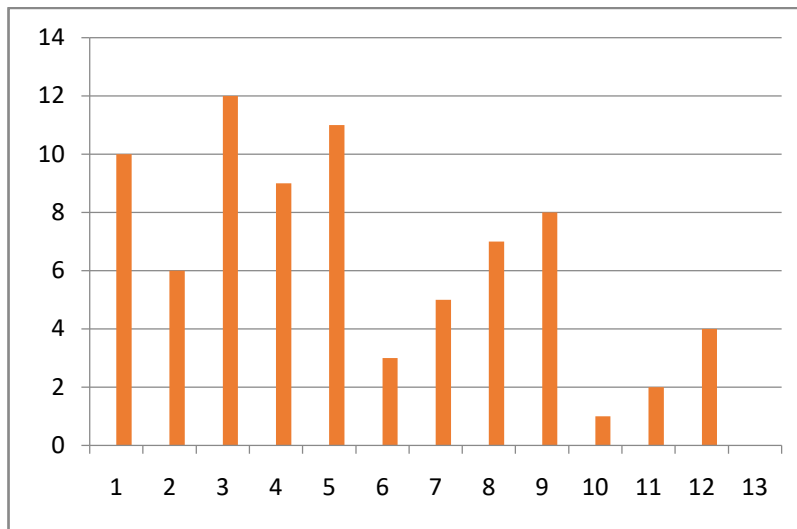

FIGURE 7. Rank mutual funds TOPSIS method

Figure 7 shows the LIC 1 is on 1st rank, LIC 2 is on 2rd rank, ICICI 3is on 3nd rank, LIC 3 is on 4th rank, UTI 1 is on 5th rank, HDFC 2 is on 6th rank, UTI 2 is on 7th rank, UTI 3 is on 8rd rank ICICI 1 is on 9th rank, HDFC 1 is on 10th rank, ICICI 2 is on 11th rank HDFC 3 is on 10th rank. First rank is very worst benefit schemes for the data set so LIC 1 is worst scheme in the data set. Last rank is best mutual fund scheme in the data set so HDFC 3 is best scheme.

4. Conclusion

The performance of mutual funds was evaluated in the study between 1997 and 2012 using data from 12 mutual fund schemes. This study uses conditional models to estimate performance. Indian mutual fund managers are strong the study reveals that they have good stock-picking skills. The study uses MCDM to look into the performance of equity-based mutual fund schemes in India. Private-sector businesses have consistently outperformed those in the public sector. While HDFC and ICICI have performed well, LIC is bad. Among LIC's 3 mutual fund schemes, neither plan worked well. On the other hand, the 3 schemes of ICICI and HDFC are highly efficient. 3 out of 2 schemes of UTI are average performers because most of its projects have delivered expected returns. In the last 15 years, Private Sector Mutual Funds (HDFC and ICICI) the results clearly show that PSUs (LIC and UTI) have outperformed. Although HDFC and ICICI mutual funds are less risky, Analysis shows that LIC is very risky. This is one of the causes of LIC's subpar performance. Private-sector mutual fund schemes are less hazardous than public-sector ventures, and the analysis generally indicated that they are more successful. The first rank for the dataset is the worst utility project, so the top 100 funds in the data set are the worst projects. The last ranked mutual fund scheme in the data set is, so sensex plan is best to plan.

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