

### **Original Research Paper**

Management

### Weighted average approach to calculation of Risk Management Index for Assessing Effectiveness of Risk Management Efforts

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ABSTRACT Risk Management Index (RMI) is a quantitative approach to measure the efficiency and effectiveness of risk management. It is a relatively new concept. In the present methodology of computing the RMI the ranks assigned by the respondents to various risk indicators on a defined scale are simply averaged and the RMI is calculated with reference to the maximum scale value. Anomaly with this kind of calculation is that the different risk indicators are considered of equal significance in relation to each other, which practically is not the case. This article proposes the concept of weighted average approach to RMI calculation with an intention of getting a more realistic picture of the status of risk management duly taking into account the significance of each of the risk indicator as well as the broad risk groups with each other.

### KEYWORDS : Average, Banking, Risk, Risk Management Index, Weighted Average

#### 1. Introduction -

Risk Management Index (RMI) is a relatively new concept. It is an attempt to measure the efficiency and effectiveness of risk management. Mckinsey report (2016), states that risk management in banks is moving towards big data analytics. Quantification and super quantification are the new approaches to risk management. Sophisticated tools or instruments like risk management index are being used by professionals in this area. A practical application of the concept of RMI, is found at the website of Institute of Internal Auditors, South Africa. In its report (2013) on corporate governance and risk management index, they introduced an index, a first of its kind to provide a better measure of performance in the areas of corporate governance and risk management. The Index was based upon survey questionnaires completed by Chief Audit Executives (CAEs), who were uniquely positioned to provide an objective, unbiased appraisal of the state of affairs in their organizations. The questionnaire had 23 single response multiple choice questions. Each of the questions was assigned a value on a scale of 0-4 in order to aggregate scores into an Index that will be tracked over time. (0= strongly disagree; 1=slightly disagree; 2=neither agree nor disagree; 3=somewhat agree; 4=strongly agree.)While the 2013 report did not carry an index, in its 2014 report the index was calculated and published. A reference to the executive summary of the 2014 report stated the methodology of calculation of the RMIs. The scores assigned by the respondents are simply averaged to find out the index on a scale of 4. For example, in case of criteria of "Ethics" the responses for 2013 were as under -

Sr.No.	Ranking	% of respondents	Number of respondent s	Total score (Rank score x Number of respondents)
1	Strongly disagree(0)	5.07	11	0
2	Slightly disagree(1)	2.76	6	6
3	Neutral (2)	4.61	10	20
4	Somewhat agree (3)	19.82	43	129
5	Strongly agree(4)	67.28	146	584
6	Don't know(0)	0.46	1	0
	Total		217	739

Table 1 – Calculation of RMI by IIA, South Africa

Risk Management Index = 739/217 = 3.4

#### 2 - Problems with the existing method -

The method used to calculate RMI as stated in the above example considers all the risk indicators at the same level of importance. It is based on the calculation of simple average of number of responses in each category. However, this may not be practically correct. At times the indicators (or questions in the questionnaire) may be of unequal significance in relation to each other. If despite the differences in the level of relative importance, equal importance is given, the results can be misleading. This can be demonstrated by way of an example. Consider that in a questionnaire on credit risk management, there are only 2 questions and there are 2 respondents. They have been asked to answer the 2 questions by way of a single response on a scale of 0-4 (0= strongly disagree; 1=slightly disagree; 2=neither agree nor disagree; 3=somewhat agree; 4=strongly agree.) We consider the following 2 questions and 2 responses –

Q.No.	Question	Response – 1	Response - 2
1	Does the BOD approve the credit risk strategy?	2	2
2	Has the bank compiled manuals for credit evaluation and approval?	4	4

#### Table 2 – Hypothetical responses for credit risk assessment

The calculation of RMI in the above case would be 3 on a maximum scale of 4.

(6+6=12 the actual score / 4 number of responses = 3)

3 an index on the scale of 4 means a performance at a level of 75%. This would be considered as a very good performance if not excellent. However, the problem is that the RMI of 3 or 0.75 or 75% is misleading. Because, the 2 indicators in the questionnaire have been considered at equal level of importance, when they should not have been. Because one can easily sense that while one question relates to credit strategy, the other one relates to a printed manual on credit evaluation. There is a big difference in the importance of these 2 activities. While both the respondents have given only 2 marks to strategy questions, they have given 4 marks to manual question. As a result the index has come to 3 thereby disguising the poor score on a crucial matter like strategy.

#### 3 - Suggestion of new method of calculation of RMI -

It is strongly suggested that the RMI should be calculated on the

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basis of weighted average and not on the basis of simple average for the simple reason that the assumption of simple average that all the risk indicators are of equal significance is not realistic. Instead the calculation of RMI for the above example can be done as under –

Q.No	Question	Response – 1		Response – 2	
		Importance (0-4)	Status (0-4)	Importance (0-4)	Status (0-4)
1	Does the BOD approve the credit risk strategy?	4	2	4	2
2	Has the bank compiled manuals for credit evaluation and approval?	1	4	1	4

Table 3 – Hypothetical responses for credit risk assessment as per proposed new method

RMI can be calculated as  $\Sigma S / \Sigma I$  where, S is the total of status responses and I is the total of importance responses. The calculation here will be adjusted for the value of status exceeding the value of importance and will be taken at the value of importance. RMI will be ((2+1)+(2+1))/((4+1)+(4+1))=6/10=0.60.

The RMI of 0.60 as against the earlier RMI of 0.75 is more reasonable.

# 4 – Comparison of RMIs based on the old & new method in the current study –

A research study has been carried by the authors under the title – "An Analytical Study of Effect of Management of Risk on Financial Performance of Selected Cooperative Banks in Pune City". 3 respondents each from 5 cooperative banks were asked to respond to a risk management assessment questionnaire. The questionnaire addressed 6 different types of risks and included 187 risk indicators spread over the 6 different types of risks. These 6 risks were – Board and Senior Management Oversight (BSMO), credit risk (CR), market risk (MR), operational risk (OR), liquidity risk (LR) and business risk (BR). Responses sought were under two columns – Importance and Actual Status, on a rank scale of 1-5 (1 lowest, 5 highest). The RMIs were then calculated for each of the banks and for each of the risks as per the table given below -

Risk	BSMO	CR	MR	OR	LR	BR
Risk Code	R1	R2	R3	R4	R5	R6
ΣС-Ι	268	805	536	239	314	250
ΣC-S	166	339	266	172	204	120
RMI	0.62	0.42	0.50	0.72	0.65	0.48
ΣN-I	249	795	521	243	296	247
ΣN-S	192	417	316	163	214	130
RMI	0.77	0.52	0.61	0.67	0.72	0.53
ΣV-I	266	809	518	216	294	242
ΣV-S	226	586	410	169	258	180
RMI	0.85	0.72	0.79	0.78	0.88	0.74
ΣS-I	264	792	516	232	283	250
ΣS-S	165	423	388	140	187	125
RMI	0.63	0.53	0.75	0.60	0.66	0.50
ΣΤ-Ι	269	796	520	234	282	250
ΣT-S	233	664	474	203	247	176
RMI	0.87	0.83	0.91	0.87	0.88	0.70
ΣA-I	1316	3997	2611	1164	1469	1239
ΣA-S	982	2429	1854	847	1110	731
RMI	0.75	0.61	0.71	0.73	0.76	0.59

 Table 4 – RMI calculation on actual research data as per proposed new methodology

 $\Sigma$ S is the total of status responses and  $\Sigma$ I is the total of importance responses.

C indicate the summation of responses from the respondents from COSMOS Bank

N indicate the summation of responses from the respondents from NKGSB Bank

V indicate the summation of responses from the respondents from SVC Bank

S indicate the summation of responses from the respondents from Saraswat Bank

T indicate the summation of responses from the respondents from TJSB Bank

The above RMI calculation has been done as per the new method where the respondent's score of relative importance of the indicators (on a scale of 0-5) have been considered in the calculation. The RMI has been calculated using the formula = RMI =  $\Sigma S / \Sigma I$ . While taking the sum of status responses a care has been taken to ignore the scores of status that are in excess of the importance using the MS Excel =IF formula. That is, if for an indicator a respondent has given an importance rank of 3 and a status rank of 5, then for summation of status ranks, this particular rank value would be taken at 3 and not 5.

We will calculate the RMI using the method as applied by the SA Association of Internal Auditors.

Risk	BSMO	CR	MR	OR	LR	BR
Risk Code	R1	R2	R3	R4	R5	R6
ΣA-I	1316	3997	2611	1164	1469	1239
ΣA-S	982	2429	1854	847	1110	731
RMI	0.75	0.61	0.71	0.73	0.76	0.59
RMI(on a scale of 5)	3.73	3.04	3.55	3.64	3.78	2.95
No of questions	20	59	40	21	28	19
RMI #	3.27	2.74	3.09	2.69	2.64	2.56

#### Table 5 – RMI calculation on actual research data as per existing method

# RMI (as per old method) =  $\Sigma$ A-S / Total number of responses = 982 / (20\*5\*3) where 20 are the number of questions, 5 are the number of banks selected as sample and 3 are the number of respondents. Therefore RMI = 982 / 300 = 3.27.

Thus, against the value of RMI of 3.73 as per the suggested method the old method returns a value of only 3.27. We can extract the following table of comparative values of the RMI as per both the methods –

Risk	BSMO	CR	MR	OR	LR	BR
Risk Code	R1	R2	R3	R4	R5	R6
RMI-New(on a scale of 5)	3.73	3.04	3.55	3.64	3.78	2.95
RMI -Existing	3.27	2.74	3.09	2.69	2.64	2.56
RMI(N)/(E)	1.14	1.11	1.15	1.35	1.43	1.15

#### Table 6 – RMI comparison on actual research data

## 5 - Analysis of variance between RMI as per proposed and existing method -

a. All the RMIs as per existing method are on the lower side indicating a relatively poorer performance as compared to the new method RMI calculations. In other words, new method RMIs reveal a better position as compared to existing method RMI calculations.

b. The reason for this difference is that while the existing method considers all the 187 questions under the 6 risks at an equal level of

importance, the new method has considered the summation of importance rank assigned to each of these 187 questions. Further while taking the summation of status responses, an adjustment has been made to cut down the excess of status ranks than the importance ranks. The rationale for this adjustment is that the index cannot be affected for the excess value of status rank than the importance rank. If some indicator has been assigned an importance rank of 1 then it cannot be assigned status rank of 5, in which case the RMI will be (5/1) = 5. Instead, here even if the status rank is assigned as 5, the MS Excel =IF formula will validate the total to consider the value as 1 and not 5.

#### 6 - Calculation of Weighted Overall Risk Management Index -

In the new method it is proposed to assign weights at 2 levels. In the calculation seen above we have seen how weights have been assigned to various indicators of liquidity risk so as to have a more realistic calculation of the RMI. In addition to the weights assigned at the individual indicator level within a risk, weights can be assigned for each of the risk group on an overall basis as well. The rationale for this is that one particular group of risk might not be as significant as that of the other on an overall basis. For example, business risk on an overall basis might be more significant than operational risk. To cater for this diversity we have sought from the respondents weights at the risk group level and the data that emerged was as under

Risk	Risk Code	Weight
BSMO	R1	4.87
CR	R2	4.93
MR	R3	3.73
OR	R4	2.87
LR	R5	2.67
BR	R6	5.00
OVERALL	RMI-O	24.07

# Table 7 – Calculation of risk-wise weights based on research data

For calculating the overall RMI we have applied the above weights instead of plain averaging. The calculation of the weighted average RMI is as under –

Risk	Risk Code	Weight	TOTAL	W XTOTAL
BSMO	R1	4.87	0.75	3.63
CR	R2	4.93	0.61	3.00
MR	R3	3.73	0.71	2.65
OR	R4	2.87	0.73	2.10
LR	R5	2.67	0.76	2.02
BR	R6	5.00	0.59	2.95
OVERALL	RMI	24.07	0.68	135

#### Table 8 – Calculation of weighted overall RMI

Overall weighted average RMI = 135/24.07 = 0.68

#### 7. Conclusion -

Calculation of RMI can be useful in assessing the effectiveness of the risk management efforts. But as a tool or instrument it needs a careful application. Results using simple average can be misleading. Instead the differences in relative importance of the risk indicators and even the risk groups should be duly factored in the calculation of the RMIs to get accurate results. The calculation of such weighted RMI's do need some additional data. But then we are living in the world of big data analytics. We cannot compromise the quality of results of the analysis for wrong application of the analytical tools and instruments.

#### References

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