

**UNIVERSITI TEKNOLOGI MARA**

**TECHNICAL REPORT**

**MCDM APPROACHES FOR PERFORMANCE EVALUATION: A  
CASE OF MICROFINANCE INSTITUTIONS IN MALAYSIA**

**(P43M22)**

**SHAZARINA BINTI SHAHAR (2020461494)  
NUR AINAA DAYANA BINTI ISHAK (2020818788)  
SITI ANISAH BINTI SHEIKH AHMAD KAMAL ALDAKHROUJ  
(2020899006)**

**Report submitted in partial fulfillment of the requirement  
for the degree of  
Bachelor of Science (Hons.) (Management Mathematics)  
Faculty of Computer and Mathematical Sciences**

**MARCH 2022**

## **ACKNOWLEDGEMENTS**

First and foremost, before we begin thanking anybody, we would like to express our gratitude towards the Almighty for blessing us with sufficient facilities in the campus and at home that has allowed us to finish what we have started and not to forget for blessing us with every single individual who was involved in this paper. Without Him, we wouldn't be here today. He is solely the reason we are still surviving.

Of course, our deepest and sincerest thank would have to be saved for our research supervisor, who has guided us through this whole entire project and has made our Final Year Project a very fun and roller coaster ride subject, DR Zahari bin Rodzi. Thank you for teaching us and correcting us for all of us to be a better person and for us to simply strive in the completion of this project.

To our comrades/friends, thank you for always being there for each one of us. A friendship that will be carried all our lives. Without your supports, we probably wouldn't be able to be where we are now. To each one of this group members, thank you for tolerating the usual late night brainstorming session for the sake of this paper. Thank you for always agreeing to go to the extra miles to ensure we deliver the best of all. All this wouldn't be possible without the ideas contributed by each of us.

Last but for sure not the very least, to our parents, mom and dad, thank you for the biggest support that you have shown us. Without you, we wouldn't even be here still standing. Thank you for raising us and always reminding us to do our very best and be the best version of ourselves. Thank you for always giving us your love and support when all else seems to fail. For you, we vow to never give up. To the rest of the family members too, thank you for simply be there. Your existence means the whole world to us.

## TABLE OF CONTENTS

ACKNOWLEDGEMENTS .....	ii
TABLE OF CONTENTS .....	iii
LIST OF TABLES .....	iv
LIST OF FIGURES .....	v
ABSTRACT .....	vi
1.0 INTRODUCTION .....	1
1.1 PROBLEM STATEMENT .....	4
1.2 RESEARCH QUESTION .....	6
1.3 RESEARCH OBJECTIVE .....	6
1.4 SIGNIFICANCE AND BENEFITS OF STUDY .....	7
1.5 SCOPE AND LIMITATION OF THE STUDY .....	8
1.6 DEFINITIONS AND TERMS .....	9
2.0 LITERATURE REVIEW .....	10
2.1 MICROFINANCE .....	10
2.2 AHP Method .....	13
2.3 CRITIC Method .....	18
2.4. TOPSIS Method .....	25
2.5 VIKOR Method .....	28
2.6 SAW Method .....	33
2.7 PROMETHEE II Method .....	37
3.0 METHODOLOGY AND IMPLEMENTATION .....	40
STAGE 1: DEVELOPMENT OF MODEL .....	41
STAGE 2: OBTAIN WEIGHTAGE FOR EACH CRITERIA .....	41
A. AHP METHOD .....	42
B. CRITIC METHOD .....	44
STAGE 3: EVALUATE AND RANK THE ALTERNATIVES .....	46
A. TOPSIS METHOD .....	46
B. VIKOR METHOD .....	48
C. SAW METHOD .....	50
D. PROMETHEE II .....	51
STAGE 4: ANALYSIS THE RESULT .....	52
4.0 RESULTS AND DISCUSSION .....	53
4.1 DATA OBTAINED .....	53
4.1 AHP METHOD .....	54
4.2 CRITIC METHOD .....	58
4.3 AHP-TOPSIS .....	63
4.4 AHP-VIKOR .....	68
4.5 AHP- SAW .....	71
4.6 AHP-PROMETHEE II .....	73
4.7 CRITIC-TOPSIS .....	78
4.8 CRITIC-VIKOR .....	83
4.9 CRITIC-SAW .....	87
4.10 CRITIC-PROMITHEE II .....	89

4.11 ANALYSIS OF OVERALL PERFORMANCE .....	94
5.0 CONCLUSIONS AND RECOMMENDATIONS .....	97
REFERENCES .....	98

## LIST OF TABLES

Table 1. Definition of Terms .....	9
Table 2. Summary of Previous Studies on Criteria Selections of MFIs .....	11
Table 3. Summary on Previous Studies by using AHP Method .....	15
Table 4. Summary on Previous Studies by using CRITIC Method .....	22
Table 5. Summary on Previous Study by Using TOPSIS Method .....	26
Table 6. Summary on Previous Studies by using VIKOR Method .....	31
Table 7. Summary on Previous Studies by using SAW Method .....	35
Table 8. Summary on Previous Studies by using PROMETHEE II Method .....	38
Table 9. Scales in pair-wise comparisons .....	42
Table 10. Random consistency index .....	43
Table 11. Criteria Values of the Selected Microfinance Institutions .....	53
Table 12. The pair-wise comparison matrix .....	54
Table 13. Normalization Matrix.....	55
Table 14. Consistency Matrix .....	56
Table 15. Random consistency index (RI).....	56
Table 16. The Average Weightage of Each Criterion.....	57
Table 17. Normalized decision matrix for CRITIC method .....	59
Table 18. Standard deviation for CRITIC method.....	60
Table 19. Calculation For Linear Correlation Coefficient.....	60
Table 20. Correlation Matrix for CRITIC Method .....	61
Table 21. Conflict Created by Criteria $j$ As Per CRITIC Method .....	62
Table 22. Quantity of the Information Values and Objective Weight as Per CRITIC Method .....	63
Table 23. Vector Value .....	64
Table 24. Normalized decision matrix for AHP-TOPSIS method.....	64
Table 25. Weighted Normalized Decision Matrix .....	65
Table 26. Positive and negative ideal solutions .....	66
Table 27. Euclidean Distance from Ideal Best and Ideal Worst .....	67
Table 28. The rank of each alternative.....	67
Table 29. The Best and Worst of Each Criteria .....	69
Table 30. The Normalization of $S_j$ and $R_j$ .....	69
Table 31. The value of $Q_i$ .....	70
Table 32. The Rank of Each Alternative .....	70
Table 33. Normalized Decision Matrix for SAW method.....	72
Table 34. Weightage for each Criteria Based on AHP Method.....	72
Table 35. Preferred Score, $V_{Ai}$ and Ranking for Alternative Based on SAW Method .....	73

## **ABSTRACT**

Microfinance is becoming more important as a major contributor to establishing new job opportunities and generating money in order to improve the poor's social and economic status and reduce poverty. Various institutions and non-banking government bodies have overseen administering Malaysia's microfinance programme. The most important institutions for this research are Amanah Ikhtiar Malaysia (AIM), Tabung Ekonomi Kumpulan Usaha Niaga (TEKUN), and Agrobank. The aim of this study is to determine the important criteria in measuring the performance of MFIs and calculate the weightage of each criterion by using Analytic Hierarchy Process (AHP) and CRiteria Importance Through Intercriteria Correlation (CRITIC) methods. Further, this paper will evaluate the performance of Microfinance Institutions in Malaysia by integrating CRiteria Importance Through Intercriteria Correlation (CRITIC) and Analytic Hierarchy Process (AHP) methods into Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), ViseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR), Simple Additive Weighting (SAW) and Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE II). Microfinance institutions in Malaysia must develop sustainability criteria that includes both financial and non-financial criteria to achieve their fundamental goals of assisting society. Thus, we chose nine important criteria which are Loan Disbursement (C1), Operating Self-Sufficiency (C2), Financing Target (C3), Revenue (C4), Repayment Rate (C5), Government Grant (C6), Breadth of Outreach (C7), Depth of Outreach (C8), and Age of MFI (C9). The result shows AIM is the best microfinance institution in Malaysia due to its consistent performance in the method proposed which is by integrating AHP and CRITIC into TOPSIS, VIKOR, SAW and PROMETHEE II.

**Keywords** - microfinance, AHP, CRITIC, TOPSIS, VIKOR, PROMETHEE II, SAW