

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**ASSESSING THE SUSTAINABILITY PERFORMANCE OF
INSURANCE COMPANIES IN MALAYSIA BEFORE AND DURING
COVID-19 USING INTEGRATED AHP-TOPSIS, AHP-VIKOR, AHP-
SAW.**

(P44M22)

**MOHAMAD SYAQIR AIMAN BIN MUSTAPAH (2020812996)
AMEERAH BINTI ZULKIFLI (2020621166)
NOR AFAF AZLIN BINTI MOHAMAD (2020608378)**

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

AUGUST 2022

ACKNOWLEDGEMENTS

Bismillahirrahmanirrahim,

Alhamdulillah, we are grateful to Allah SWT for His permission that we can complete this project successfully. We would also like to say gratitude to the Faculty of Mathematics and Computer Sciences, Universiti Teknologi MARA, UiTM for providing us the infrastructure and opportunity to explore and learn more about our course. First and foremost, our deepest gratitude and appreciation to Dr Zahari bin Md Rodzi, our supervisor who has giving us guidance from the start to the end of our project. He has been a great help, and without his assistance, we would not be able to have completed this case study. Furthermore, we also would like to thank Madam Rossidah, for all the knowledge and guidance she has given to all of us on completing this project.

Deepest thanks and appreciation to our parents, family, friends, and others for their cooperation, encouragement, constructive suggestions, and support from the beginning till the end. Also, thanks to everyone that has contributed something by supporting this work and helped me during the research progress till it is fully completed.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	1
TABLE OF CONTENTS	2
LIST OF TABLE	3
LIST OF FIGURE	4
ABSTRACT	5
CHAPTER 1.....	6
1.0 INTRODUCTION.....	6
1.1. PROBLEM STATEMENT	7
1.2. RESEARCH OBJECTIVES	8
1.3. SIGNIFICANT AND BENEFIT OF STUDY	8
1.4. SCOPE AND LIMITATION OF STUDY.....	9
CHAPTER 2.....	10
LITERATURE REVIEW	10
2.0 INSURANCE INDUSTRIES.....	10
2.1. THE PREVIOUS STUDIES OF INSURANCE COMPANIES	11
2.2. TOPSIS.....	13
2.3. VIKOR	14
2.4. AHP.....	12
2.5. SAW.....	16
CHAPTER 3.....	17
METHODOLOGY AND IMPLEMENTATION	17
3.0 TOPSIS.....	18
3.1. VIKOR	20
3.2. SAW	22
3.3. AHP.....	23
3.4. DATA.....	25
CHAPTER 4.....	29
FINDING AND DISCUSSION : WEIGHTAGE CALCULATION.....	29
4.0 AHP.....	29
CHAPTER 5.....	32
FINDING AND DISCUSSION	32
5.0 AHP-VIKOR.....	32
5.1. AHP-SAW.....	36
5.2. AHP-TOPSIS	40
CHAPTER 6.....	47
CONCLUSION	51
REFERENCES.....	52

LIST OF TABLE

Table 1 the previous studies regarding the insurance companies.....	11
Table 2 Table of significant scales	23
Table 3 Consistency Index	25
Table 4 Classification Of Insurance Campany	25
Table 5 data from 2020	26
Table 6 data from 2019	27
Table 7 data from 2018	27
Table 8 data from 2017	28
Table 9 Comparison Of The Criteria Using Pair-Wise Comparison Matrix	29
Table 10 Normalize the Matrix	30
Table 11 Consistency Matrix	30
Table 12 Resulting weights obtained with expert judgments.....	32
Table 13 The best and the worst values of all criterion function in 2020	32
Table 14 Calculation of S_j for criteria in 2020.....	33
Table 15 Calculation Of S_j , R_j And Q_j For Criteria for 2020.....	34
Table 16 VIKOR ranking for the period 2020.....	34
Table 17 Comparing the ranking of the 13 general insurance companies using the integrated AHP-VIKOR approach.....	35
Table 18 Normalized Decision Matrix for 2020	37
Table 19 The preference score for 2020.....	38
Table 20 SAW ranking for the period 2020	38
Table 21 Comparing the ranking of the 13 general insurance companies using the integrated AHP-SAW approach	39
Table 22 Vector Normalization for year 2020.....	40
Table 23 Normalised Decision Matrix for year 2020.....	41
Table 24 Euclidean Distance from Ideal Best for year 2020.....	42
Table 25 Euclidean Distance from Ideal Worst for year 2020	43
Table 26 Performance Score and Rank for year 2020.....	44
Table 27 the ranking of each alternative by integrated AHP-TOPSIS technique for the 13 selected insurance companies in Malaysia.....	45
Table 28 the comparison between the 3 methods for year 2017	47
Table 29 the comparison between the 3 methods for year 2018	48
Table 30 the comparison between the 3 methods for year 2019	49
Table 31 the comparison between the 3 methods for year 2020	49

ABSTRACT

Insurance enterprises play a critical part in a country's economic and financial development on a global scale. In comparison to two decades ago, the insurance industry in Malaysia has changed dramatically. However, in recent years the global economy has been hit hard by the Covid-19 outbreak, as we all know. The epidemic has had a significant impact on the insurance industry. During the Covid-19 outbreak, most insurance businesses have seen an economic downturn. Efficiency assessment and a comprehensive efficiency rating of insurance companies are critical for decision-makers to make the required changes and improvements. The study conducted to determine the changes of insurance industries before and post covid-19 outbreak. Multi-criteria decision making has been proven as an effective method to measure the efficiency rating of insurance companies. Integrated Analytic Hierarchy Process (AHP) methods are used in order to calculate the weightage. Then, integrated AHP- Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), AHP- VIKOR and AHP-SAW methods are used in this report in deciding the rank of the sustainability of the insurance companies. The data for this study was collected from 2017 to 2020 which the year 2017,2018 and 2019 will represent the data before covid-19 outbreak while for the year 2020 will represent data for post covid-19 outbreak. There are 13 insurance companies in Malaysia that were selected for the purpose of this study. Also, these criterias has been choosen as the attributes to determine the sustainability of the insurance company. The criterias are total asset, total liabilities, total equity, net earned premiums, net profit and benefits & claims. The full ranking of all the insurance companies under investigation was achieved using proposed methods. The best method that was selected from the three hybrid method was AHP-TOPSIS. This is because it can be seen from the result that the ranking of the insurance companies for the 4 years has been consistent. It can be concluded that Great Eastern Life Assurance (Malaysia) Berhad is the most sustain insurance company while Gibraltar BSN Life Berhad is the least sustain insurance company after the Covid-19 outbreak.