

**APPLICATION OF FUZZY ANALYTICAL HIERARCHY
PROCESS (FAHP) AND TECHNIQUE FOR ORDER
PREFERENCE BY SIMILARITY TO IDEAL SOLUTION
(TOPSIS) IN FAST FOOD RESTAURANT LOCATION
SELECTION**

MOHD ZUL FIKRI BIN MOHD ZUBIR

**Thesis Submitted in Fulfilment of the Requirement for
Bachelor of Science (Hons.) Computational Mathematics in the
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA**

July 2021

ABSTRACT

Location play an important role for fast food restaurant and affect their profitability so a lot of factors need to be considered before settling down at a specific places. In order to evaluate the most suitable location, method of fuzzy analytical hierarchy process is used. All of the factors are described in numerical values and their weightage are determined using Buckley's geometric mean method. These weightage later incorporated into a decision matrix where the score of each alternatives location are calculated by using TOPSIS. From the result, the highest score is deemed to be the best location to launch a new fast food restaurant.

ACKNOWLEDGEMENT

In the name of Allah, Most Gracious, Most Merciful. Thanks to Allah for giving me the chance and strength to finish this final year project. First and foremost, I would like to express my gratitude to Madam Rohayati binti Mat Ripin for supervising me during the completion of the project. I am very grateful for all the guidance and encouragement given to me throughout the start until the finish line. I also offer my sincere thanks to all my friend who helped me along the ways to overcome the struggle in writing this project. Last but not least, thanks to my parent for their endless support and help in finalizing this project.

TABLE OF CONTENTS

DECLARATION BY THE SUPERVISOR	i
DECLARATION BY THE CANDIDATE	ii
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	x
INTRODUCTION OF RESEARCH	1
1.1 Introduction	1
1.2 Background of Study	1
1.3 Problem Statement	2
1.3.1 Objectives	2
1.4 Significance of the Project	3
1.5 Scope of the Project	3
1.6 Project Benefits	4
1.7 Definition of Terms and Concept	4
1.8 Organization of Report	5
LITERATURE REVIEW	6
2.1 Introduction	6
2.2 Literature Review	6
2.2.1 Factor influencing location selection	6
2.2.2 Fuzzy Analytical Hierarchy Process (FAHP)	8

2.2.3 Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) -----	9
2.3 Conclusion -----	12
METHODOLOGY -----	13
3.1 Introduction -----	13
3.2 Research Steps -----	13
3.3 Conclusion -----	18
IMPLEMENTATION -----	19
4.1 Introduction -----	19
4.2 Determine Main Criteria and Sub-criteria -----	19
4.3 Establishing Fuzzy Scale of Importance -----	21
4.4 Creating Fuzzy Comparison Matrix-----	22
4.4.1 Comparison Matrix of Main Criteria-----	22
4.4.2 Comparison Matrix of Sub Criteria-----	23
4.5 Calculating Fuzzy Geometric Mean of Each Criteria -----	27
4.5.1 Fuzzy Geometric Mean for Main Criteria-----	27
4.5.2 Fuzzy Geometric Mean for Sub Criteria-----	28
4.6 Calculating Fuzzy Weight of Each Criteria -----	30
4.6.1 Fuzzy Weight of Main Criteria-----	31
4.6.2 Fuzzy Weight of Sub Criteria-----	33
4.7 Defuzzify and Normalise Fuzzy Weight -----	40
4.7.1 Weight of Main Criteria -----	40
4.7.2 Weight of Sub Criteria -----	41
4.7.3 Normalisation of Main Criteria Weightage -----	43
4.7.4 Normalisation of Sub Criteria Weightage -----	44