

**Universiti Teknologi MARA**

**Performance Evaluation of Mobile  
Network Operators in UiTM Perlis  
Using Data Envelopment Analysis**

**Nur Shafiqah Binti Hamidon**

**Report submitted in fulfilment of the requirements  
for Bachelor of Science (Hons.) Management  
Mathematics Faculty of Computer and Mathematical  
Sciences**

**July 2020**

## **STUDENT'S DECLARATION**

I certify that this report and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.



.....

**NUR SHAFIQAH BINTI HAMIDON**

**2017130241**

**AUGUST 5, 2020**

## ABSTRACT

Mobile network operators are a provider of services in terms of wireless communications to mobile users. In Malaysia, there are four main mobile network operators (MNO) subscribed by Malaysians, which are Maxis, Celcom, Digi, and U Mobile. However, the number of complaints from the customers continues to increase every year due to dissatisfaction with the services provided. Most of the customers face a difficult situation in choosing the most affordable MNO based on their preferences. The company of MNO also need to consider customer satisfaction to survive in the market and compete with the competitor. Quality of services, billing and price, customer services, network connectivity, and promotions and delighting customers are the major factors of customer satisfaction. A questionnaire was distributed to collect data from 265 mobile users through a simple random method. This study aims to measure the efficiency of the MNO and determine the ranking of the most preferred MNO based on customer satisfaction factors. In the Data Envelopment Analysis (DEA), the Slack-Based Measured (SBM) Model was used to calculate the efficiency of each operator, while Super SBM Model assisted in ranking the mobile network operators. The results of this study showed that Celcom is the most preferred mobile network operator and followed by U Mobile, Maxis, and Digi. Thus, the findings of this study can help mobile users choose the best mobile network operators, and telecommunication companies can also improve their service performance to satisfy their customers' needs.

**Keywords:** Mobile Network Operators, Data Envelopment Analysis, Slack-Based Measure Model, Super SBM Model, Efficiency

# TABLE OF CONTENTS

<b>CONTENTS</b>	<b>PAGE</b>
<b>SUPERVISOR’S APPROVAL</b>	ii
<b>STUDENT’S DECLARATION</b>	iii
<b>ACKNOWLEDGEMENT</b>	iv
<b>ABSTRACT</b>	v
<b>TABLE OF CONTENTS</b>	vi
<b>LIST OF FIGURES</b>	viii
<b>LIST OF TABLES</b>	ix
<b>LIST OF ABBREVIATIONS</b>	x
 <b>CHAPTER 1: INTRODUCTION</b>	
1.1 Background of the Study	1
1.2 Problem Statement	2
1.3 Objective of the Study	3
1.4 Scope of the Study	3
1.5 Significance of the Study	4
1.6 Summary	4
 <b>CHAPTER 2: LITERATURE REVIEW</b>	
2.1 Customer Satisfaction of Mobile Network Operator	5
2.2 Data Envelopment Analysis (DEA) Method	7
2.3 Summary	8
 <b>CHAPTER 3: RESEARCH METHODOLOGY</b>	
3.1 Method of Data Collection	9

3.2	Method of Data Analysis	12
3.2.1	Method of Data Envelopment Analysis (DEA)	13
3.2.2	Selection of DMU, Input and Output Variables	13
3.2.3	Slack-Based Measures (SBM)	15
3.2.4	Super Efficiency SBM Oriented	16
3.3	Pre-Processing Data	16
3.4	Processing Data	22
3.5	Summary	22

#### **CHAPTER 4: ANALYSIS AND DISCUSSION**

4.1	The Efficiency of Mobile Network Operators	28
4.2	Performance Variable	29
4.2.1	The Projection of Input and Output Variables	29
4.3	Ranking of Mobile Network Operators	30
4.4	Summary	32

#### **CHAPTER 5: CONCLUSION AND RECOMMENDATION**

5.1	Conclusion	33
5.2	Recommendation	34
5.3	Summary	34

#### **REFERENCES**

#### **APPENDICES**

APPENDIX A: SAMPLE OF QUESTIONNAIRE	37
-------------------------------------	----

APPENDIX B: DATA FROM RESPONDENT	43
----------------------------------	----