
RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0



CS240 - BACHELOR OF INFORMATION TECHNOLOGY [HONS.]
CS248 - BACHELOR OF SCIENCES [HONS.]
MANAGEMENT IN MATHEMATICS
CS251 - BACHELOR OF COMPUTER SCIENCE [HONS]
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DATA COMMUNICATION & NETWORKING

2nd February 2023
Stor Complex, UiTM Perlis

Organized by:
College of Computing, Informatics and Media
Universiti Teknologi MARA Perlis Branch

**Research Exhibition in Mathematics and Computer Sciences
(REMACS 5.0)**

Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)

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e ISBN: 978-629-97934-0-3



Perpustakaan Negara Malaysia

Published by

MOHAMMAD HAFIZ BIN ISMAIL

Universiti Teknologi MARA

02600 Arau, Perlis

Tel: +604 988 2028

<https://fskmpерlis.uitm.edu.my/remacs50/>

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Preface

It is with great pleasure that we present this extended abstract book, titled "The 5th Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)". This book is a collection of research work in the fields of Computer Science and Mathematics, contributed by the final year students from Universiti Teknologi MARA, Perlis Branch. The aim of this book is to showcase the diversity and depth of research in these two interrelated fields.

Mathematics and Computer Science are two fields that have seen tremendous growth and advancement in recent years. With the rise of new technologies and the increasing demand for data-driven solutions, researchers in these fields have been working hard to develop new theories, algorithms, and models that can help solve some of the most pressing problems of our time. This book is a testament to their hard work and dedication.

The abstracts in this book cover a wide range of topics, including algebra, analysis, logic, computer architecture, algorithms, artificial intelligence, machine learning, computer network, netcentric computing and many more. The work presented here is both theoretical and practical, and has the potential to impact many areas of society, from finance and healthcare to education and security.

We hope that this book will serve as a valuable resource for future students in the fields of Mathematics and Computer Science. We also hope that it will inspire more students to pursue innovative and groundbreaking research in these two fields. Finally, we would like to express our gratitude to all the contributors for their hard work and dedication, without which this book would not have been possible.



RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
REMACS 5.0

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EVENT SCHEDULE

8:00 – 8:30 am

- Registration

8:00 am – 12:00 pm

- FYP Project Presentation

12:00 - 2:00pm

- Lunch Break

2:15 – 2:35 pm

- National & Wawasan Setia Anthems
- Doa Recitation

2:35 – 2:45 pm

- Welcoming Address by Director of REMACS 5.0

2:45 – 2:55 pm

- Officiating & Closing Remarks from Rector of UiTM Perlis

2:55 – 3:00 pm

- REMACS 5.0 Montage

3:00 – 4:00 pm

- Awarding of Winners:
 - Best Poster
 - Best Project Award

- Photo Session

- End of Ceremony

Dress Code: Formal / Corporate

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EXTENDED ABSTRACTS

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
REMACS 5.0

ANALYSING THE EFFICIENCY OF LOCAL AND FOREIGN CARS IN MALAYSIA USING DATA ENVELOPMENT ANALYSIS (DEA)

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Abstract

The most important aspect in choosing your car is quality and durability and most people tend to ignore them as the car visualisation and well-known car seems to be the more important point. On the other hand, different size of wages for each individual shows that there is a specific car that matched their ability to pay and still have an impressive balanced in their bank account. This research helps people to value all the car that suits them by using Data Envelopment Analysis (DEA). DEA is a non-parametric approach used to analyse the relative efficiency of decision-making units (DMUs) under conditions where multiple inputs and multiple outputs are present. All the data on cars' specifications have been collected and converted to DEA-Solver, a software that measured the car's efficiency and effectiveness. ZIGWHEELS website is the platform for choosing all those cars and 25 cars had been chosen according to their best car in each segment (sedan, hatchback, MPV, and SUV) between 2020-2021 along with the specifications found on WAPCAR websites. The inputs and outputs chosen are top speed, horsepower, torque, safety recognition, price, service cost, fuel consumption, and engine capacity. As the result, few cars do not reach the efficiency value of 1 or inefficient DMUs, therefore, helping people to choose cars of their own and can save some time in choosing which car is the best for them.

Keywords: car, efficiency, DEA

1. Introduction

The main objective is to evaluate the overall car performance in Malaysia involving both local and foreign cars. This study has a specific goal of measuring the efficiency of cars and ranking the cars in Malaysia using the Data Envelopment Analysis method based on chosen factors. This study focuses on using the Data Envelopment Analysis (DEA) method to determine the car's efficiency and effectiveness. The secondary data is collected from the ZIGWHEELS website based on the best car from each category and the specification of the car is collected from the WAPCAR website.

2. Methodology

The data to know which cars are currently top in the Malaysian market and demand was collected through the ZIGWHEELS website and divided into two categories local and foreign cars. In addition, the car has been sub-categorized into four different car types: hatchback, sedan, MPV, and SUV. 25 different cars were chosen based on popularity and price suitability for various income Malaysians. The value is all in numbers for each specification, but it came up with an inconsistent size of the value, so it was done through data normalization to make it consistent. This project is carried out in two stages. Instead of physically measuring the DEA formula, new computing methods have been developed. Microsoft Excel is the optimal tool for

measuring output using the DEA approach. Excel's solvers, such as the DEA solver, will optimize any required formulation, whether linear or non-linear.

3. Results and Discussion

There more than half of the cars chosen reach the efficiency value of 1 showing that the buyer will have more choices to own their next car or their first car. However, surprising results show that famous cars such as Myvi, Alza, and City did not reach the efficiency value of one and were considered inefficient DMUs proving that not all famous and fancy car is efficient if we take more important specifications into account. As of result, we can see that DEA is a good method for analysing and measuring car efficiency. From each sub-category, there are one or two cars that do not achieve the efficiency value of 1. Therefore, only one car will be taken to show how to implement the equation of the CCR-O Model which is the car that reaches the value of 1 efficiency and the cheapest car from each category. The car chosen is Bezza for sedan car, Axia for hatchback car, Grand Livina for MPV car, and Aruz for SUV car.

4. Novelty of Research / Product

There have been several research that measured the efficiency of cars. According to Fariborz and Rebecca (2013), four different extensions of Data Envelopment Analysis (DEA) were used to rank the relative performance of sustainable vehicles. Another study by Christos Papahristodoulou (1997) evaluates the efficiency of personal cars using the non-parametric DEA approach. The result shows that smaller cars are more efficient than larger ones, especially Korean ones. Previous research about cars' efficiency that was also done using DEA Solver by Faqihah (2020) resulted in five out of twelve fully efficient cars. Therefore, the focus of this research is to provide some helps to individuals that looking to buy their car for the first time without considering their monthly income. Besides, this research separated into four different types of cars to ease the buyer into matching their needs and demands.

5. Conclusion

In conclusion, it helps all the potential buyers to choose a car for them to use daily and gain some exposure in analysing all the cars that bring to their attention. On the other hand, more than half of local cars reach the efficiency value of 1 proving that our local technology is on the same level as other well-known car brands from all over the world.

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Research Exhibition in Mathematics and Computer Sciences: REMACS 5.0
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e ISBN 978-629-97934-0-3

