

FUZZY VIKOR FOR RANKING CARS AMONG UNIVERSITY FINAL YEAR STUDENTS

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Abstract

Owning a car is important for final-year students transitioning into working life. However, choosing a car to buy is not easy. This is because there are a wide variety of cars available in the market. This can make the buyer feel overwhelmed to decide which car is the best fit for them. This study aims to identify the most important criteria students consider when purchasing a car and to rank selected car models using the fuzzy VIKOR method. This study also aims to compare the fuzzy VIKOR ranking with students' intuitive ranking (without fuzzy VIKOR). The cars chosen for this study are Perodua Axia, Perodua Bezza, Perodua Myvi, Proton Saga and Proton Iriz. The criteria chosen for this study are price, fuel efficiency, safety, exterior design, and interior design. The respondents of the study are 139 UiTM Perlis final-year students. It was found that the number one criterion that students will consider if they want to buy a car is price. It was also found that Perodua Axia is the most suitable cars for students who will soon graduate even though the most desired car among them is Perodua Myvi. The fuzzy VIKOR approach proved effective in handling subjective preferences and produced a fairer ranking outcome, supporting students and car marketers in decision-making.

Keywords: VIKOR, MCDM, Cars, University Final Year Students

1. Introduction

Final-year university students often see owning a car as a practical need, not just for convenience but also to prepare for future responsibilities as they move into working life. Since car selection involves many criteria like price, fuel efficiency, safety, exterior design and interior design, this study uses the Fuzzy VIKOR method to help students make better decisions based on their personal preferences. The aims of this study are to find out which criteria matter most, rank cars using Fuzzy VIKOR and compare the results with rankings that do not use fuzzy VIKOR methods. Five local car models which are Perodua Axia, Perodua Bezza, Perodua Myvi, Proton Iriz and Proton Saga were rated by 139 final-year students from UiTM Perlis.

2. Methodology

This study applied the fuzzy VIKOR multi-criteria decision-making (MCDM) approach to help final-year university students rank five car models based on their preferences. A total of 139 final-year students from UiTM Perlis participated in the survey. They were asked to evaluate five selected criteria which were price, fuel efficiency, safety, exterior design, and interior design. The data were collected through an online questionnaire using linguistic variables, which were then converted into fuzzy numbers. These fuzzy values were averaged to determine the importance of each criterion and the performance of each car alternative. The Fuzzy VIKOR steps included constructing a fuzzy decision matrix, identifying the fuzzy best and worst values, and calculating separation measures (S and R). Then, and these values were defuzzifying using the centroid method. The final Q-index was calculated to rank the cars, where a lower Q value indicated a better alternative. This structured method provided a practical way to support decision-making involving multiple, subjective, and conflicting criteria (Opricovic & Tzeng, 2004),

3. Results / Findings

The findings showed that price is the most important criterion for final-year university students when choosing a car followed by fuel efficiency. Then, safety, exterior design and interior design. This reflects students' financial limitations as most are still dependent on their families or just starting to manage their own finances. This finding aligns with Ulkhaq et al. (2018), who also found that price as the top priority for car buyers in developing countries. Based on the Fuzzy VIKOR analysis, Perodua Axia was ranked the most suitable car with a Q value of 0.070 due to its low cost and high fuel efficiency. Perodua Myvi followed closely with a Q value of 0.071, offering better features but at a higher price. Perodua Bezza, Proton Saga, and Proton Iriz ranked third to fifth respectively. These results show that Fuzzy VIKOR is useful in combining both subjective preferences and objective data for better decision-making (Opricovic & Tzeng, 2004). It also highlights how affordability and practicality guide car choices among young first-time buyers.

4. Novelty of Research

This study introduces a unique application of the Fuzzy VIKOR method to support final-year university students in making decisions of car purchasing. While Fuzzy VIKOR has been widely applied in fields such as supply chain management (Rostamzadeh et al., 2015) and ergonomic assessment (Koppiahraj et al., 2020), its use in consumer decision-making for first-time car buyers among students in Malaysia is still limited. The novelty of this study lies in its focus on a specific and underrepresented group which students transitioning into working life. By integrating both objective criteria like price and fuel efficiency and subjective preferences such as safety, exterior design and interior design this study provides a more realistic way of choosing cars that suits what students want and need. Moreover, this study shows how Fuzzy VIKOR can help match what consumers expect with what car makers offer, giving useful insights for both students and car companies aiming at young buyers in Malaysia.

5. Conclusion or Future Work

This study shows that Fuzzy VIKOR is effective in ranking cars based on both practical and personal factors. This will help university final year students make better choices. Future study can include more car models such as Honda Civic. Besides, using different decision-making methods like fuzzy AHP, Fuzzy PROMETHEE and consider more criteria such as maintenance cost and engine performance.

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