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Factors Affecting Consumers' Buying Decision Behaviour for Eco-Cars

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Abstract
This independent study aims to 1) examine the marketing mix factors that influence decision-making behavior in purchasing an eco-car (ECO-Car), and 2) compare personal factors that affect decision-making behavior in the purchase of ECO-Cars. This research follows a quantitative approach. The sample for the study consists of 222 individuals from a province in Thailand, with the sample size determined using Taro Yamane's formula and selected through accidental sampling. Data were collected via questionnaires and analyzed using statistical methods such as Frequency, Percentage, Means, Standard Deviation, Independent Sample t-test, and one-way ANOVA, with a significance level set at 0.05. To further assess group differences, Scheffe Analysis was used for pairwise comparisons. The results indicated that 1) overall, respondents held high opinions regarding the factors affecting decision-making behavior in purchasing an ECO-Car. 2) Significant differences were observed when comparing opinions on factors influencing decision-making behavior, with 12 differences based on gender, 29 differences based on age, 13 differences based on marital status, 15 differences based on educational level, 26 differences based on occupation, and 26 differences based on income. All these differences were significant at the 0.05 level.

Keywords: Behaviour of Buying, Decision-Making, Eco-Car

Introduction

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In recent years, the automotive industry has undergone significant transformation, largely due to growing concerns about environmental sustainability and rising awareness of climate change. As the global push for reduce carbon emissions intensifies, consumers are increasingly gravitating toward eco-friendly products, particularly in the realm of transportation (Campino et al., 2023). The element of that shift is eco-cars, also referred to as green or environmentally friendly vehicles, which offer lower emissions, more energy efficiency, and less require on fossil fuels. These automobiles range from completely electric vehicles (EVs) that operate entirely from rechargeable batteries to hybrid devices that blend electric power with conventional internal combustion engines (Sun & Lee, 2024). Manufacturers have each taken significant actions that promote the use of eco-cars since they recognize how important vehicles are in overcoming environmental issues. However, despite these initiatives, consumer acceptability of eco-cars varies by location and demography (Buhmann & Criado, 2023). Technological advancements in the automotive industry have significantly impacted consumer attitudes towards eco-cars. Initially, many consumers viewed EV and hybrids as inferior to traditional vehicles due to concerns about limited driving range, long charging times, and charging station availability (Narayan et al., 2022). However, recent technological innovations have improved the performance of eco-cars, offering longer driving ranges, faster charging capabilities, and enhanced performance. Major automakers like Tesla, Nissan, and BMW have invested heavily in developing electric models that rival or surpass traditional gasoline-powered cars in terms of speed, acceleration, and overall driving experience, making eco-cars a more attractive option for a wider range of drivers (He & Hu, 2024).

Social and Psychological Influences

Social and psychological factors significantly influence consumer behaviour when purchasing eco-cars. Social norms, peer pressure, and the desire to project a certain image or identity influence the decision (Rainieri et al., 2023). Eco-cars are often seen as status symbols in environmentally conscious communities, reflecting one's commitment to sustainability. The desire to be associated with eco-friendly lifestyles can motivate consumers to choose an eco-car, even if cost or performance are not the primary considerations (Wei et al., 2023). Consumer', 'Purchase', 'Market', 'Vehicle' and 'Electric Vehicle'. Fig. 11 at the end of this section explains the motivating and inhibiting factors regarding the behaviour of consumer and customer, respectively, analysis suggests three drivers of purchase intentions: price consciousness, concern for the environment and the consumer's perception and personality. Price consciousness is defined as the extent to which a consumer is aware and responsive to the cost of acquiring an EV among other vehicle options. In a market consisting of different types of vehicles, most of the times, price becomes an important consideration in the purchase decision. A good number of consumers might look at perhaps the initial price of electric cars versus that of gas-powered vehicles, looking at considerations of high ultimate costs incurred in fuel and maintenance. For

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example, in spite of the expensive cost of buying an electric car, most individuals ignore the cost of buying the vehicle and instead think about the cost of owning that car for a period of time, when subsidies and government assistance, fuel costs, and depreciation are taken into account. Figure 1 shows the factors affecting consumers' buying decision behaviour for eco-cars. Zhang et al. (2022) explored the role of psychological and social factors in EV adoption, emphasizing frameworks like the Theory of Technology Acceptance Model (TAM). However, the Value–Belief–Norm (VBN) framework has gained attention for capturing the normative influence on pro-environmental behaviour. Higueras-Castillo et al. (2023) employed structural equation modelling to examine the influence of national culture by VBN models. The adoption of electric vehicles is highly influenced by cultural variations, according to the results. The results offer guidance for initiatives and policies aimed at advancing environmentally friendly mobility in a variety of cultural situations. Sakib et al. (2024) associated research is on parking management systems that optimum the distribution of parking spaces to lower emissions and improve user comfort. Adaptive trade-off optimization for emissions that examine fuel-saving tactics, dynamic slot allocation, and priority-based systems for EVs. van Huyssteen and Rudansky-Kloppers (2024) explored the intersection of Nature-Based Solutions (NBS), co-creation processes are focused Eco car was a combined with framework to enhance collaboration and societal transformation. Vassi et al. (2023) explained the motivational factors and personal characteristics influencing the adoption of car sharing systems in Greece. Through qualitative analysis, six core factors familiarity, comfort, mind-set, everyday life, usability, and economy were identified. The study aims to identify and analyse the factors influencing consumers' buying decisions for eco-cars, focusing on environmental awareness, economic benefits, social influence, and technological features to provide actionable insights for stakeholders.

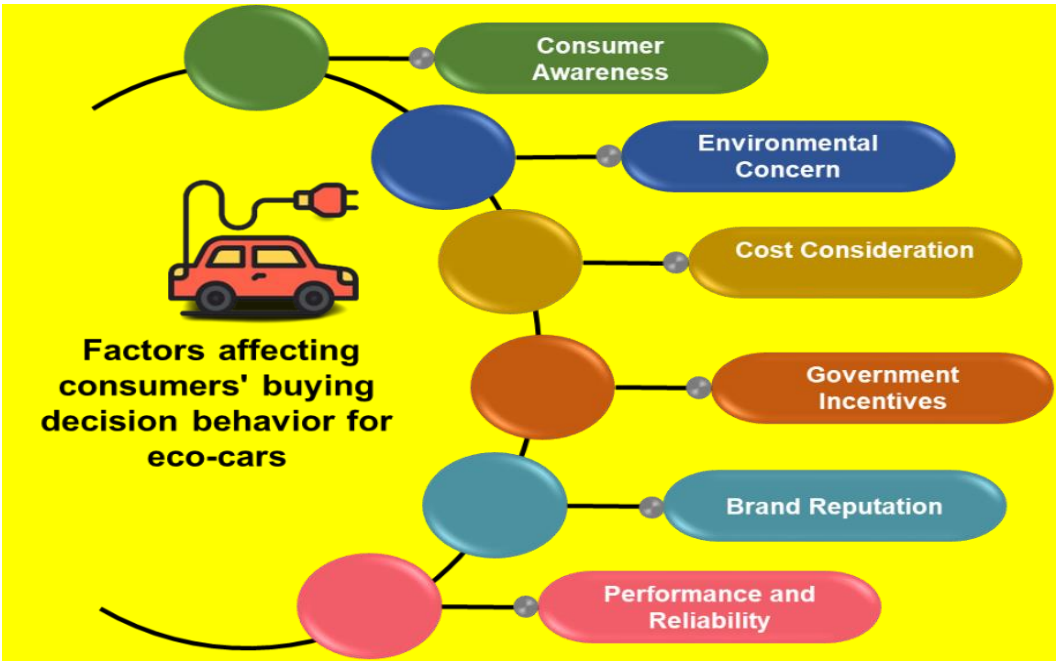

Figure 1: Factors Affecting Consumers' Buying Decision Behaviour for Eco-Cars

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Derivation and Importance of the Problems

The first appearance of international standard energy-saving cars, or Eco-Cars, in Thailand, was in 2007 to stimulate car sales and promote growth. The goal is to make Thailand a base for producing and exporting cars to countries around the world, meeting the needs in terms of price, energy efficiency, and primarily environmental friendliness. It also meets the needs of urban dwellers who want to use it for general driving purposes. It is considered a good option. As for which car model to choose, it's probably based on each person's style. Some people prioritize the brand, while others focus on utility. Due to the pandemic outbreak of the COVID-19 virus, many industries, including the Thai automobile industry, were greatly affected. As a result, sales began to shrink from the beginning of 2020. A clearer picture of the impact was seen during February - March 2020. As the virus began to spread more widely, car shows had to be cancelled. Instead of the usual surge in car sales during March, the opposite happened. Many people started trying to reduce expenses in various ways to reserve money for future needs and maintain financial liquidity. Therefore, the decision to buy a new car during this period may have to be postponed. However, "Cars" are still considered a necessity for everyone because they provide convenient transportation. Public transport is now riskier than ever. Regarding the price of fuel increases, it incentivizes people to use personal cars more than before. If the budget is limited, considering the Eco Car group is a good option. Not only are they affordable, but they also save on fuel and are environmentally friendly. Figure 2 shows the Sales of ECO-Cars 2019 - 2021 (number of cars).

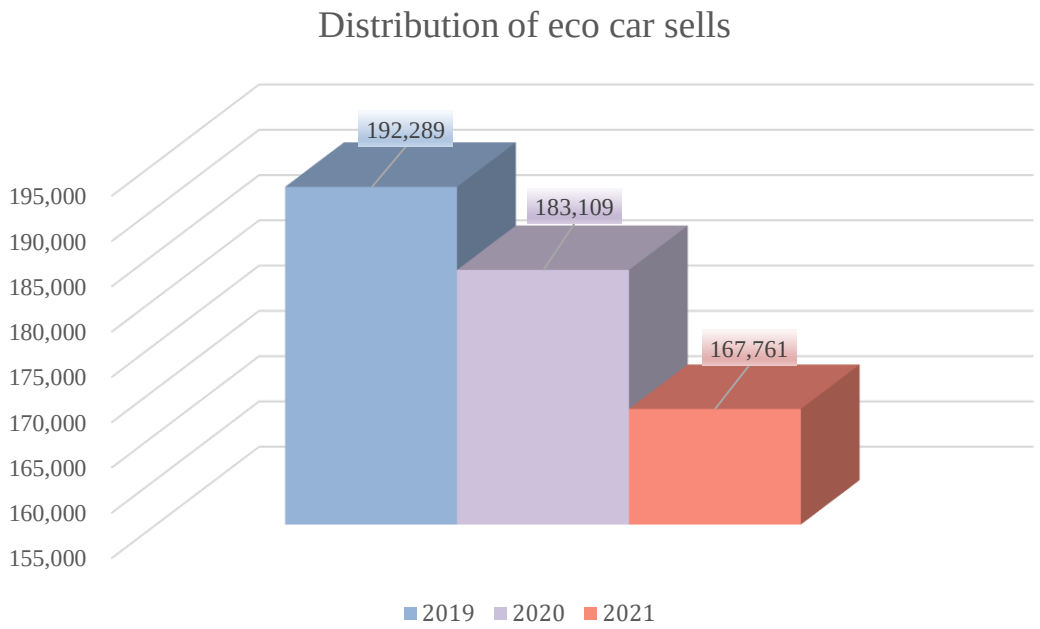

Figure 2: Sales of ECO-Cars 2019 - 2021 (Number of Cars)
Source: headlightmag.com, 2021

The number of ECO-Cars sold in 2020 was 183,109 units, and in 2021, there were

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167,761 units sold, showing a decrease from the year 2019, which had sales of 193,289 ECO-Cars. This decline indicates that sales continued to decrease from 2019 to 2020, likely due to the Covid-19 epidemic situation Figure 3 shows the Growth rate of gross domestic product (GDP) Year 2019-2021 (%).

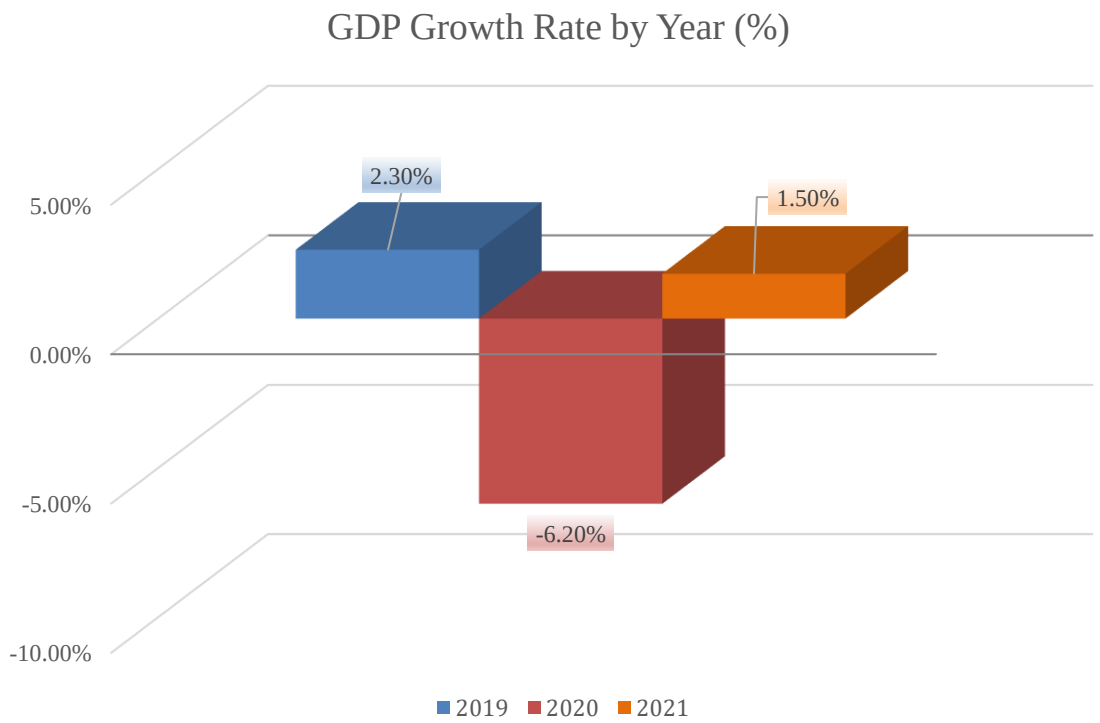

Figure 3: Growth Rate of Gross Domestic Product (GDP) Year 2019-2021 (%)

From the information mentioned above, the researcher observed that the growth rate of GDP in 2019 had an expansion rate of 2.3%, resulting in sales of 193,289 ECO-Cars. However, in 2020, a situation occurred and the COVID-19 outbreak. Resulting in a decrease in the expansion rate to -6.2%, and sales decreased to only 183,109 vehicles in 2020. However, in 2021 an expansion rate of 1.5%, sales decreased further to only 167,761 vehicles. This highlights the economic challenges during the COVID-19 situation. In addition, there is the problem of continually rising fuel prices and other economic challenges. Therefore, the researcher is interested in the decision to purchase an Eco-Car and advocates for the use of ECO-Cars, which can save money on fuel and are primarily environmentally friendly (Turoń, 2023). To provide information for those interested in buying a car that saves money during the crisis of rising fuel prices without worry.

Research Objectives and Scope of the Research

The primary objectives of this study are to investigate the marketing mix factors that influence decision-making behavior in the purchase of ECO-Cars and to compare the personal factors that affect decision-making in ECO-Car purchases, categorized by personal status. This research will explore the marketing mix factors that influence

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decision-making behavior in the purchase of ECO-Cars and compare these factors across different personal statuses. The study focuses on the population residing in a province in Thailand in 2022, totaling 5,527,994 people. The sample group was determined using Taro Yamane's formula, with a confidence level of 95 percent and an acceptable error margin not exceeding five percent. Based on these criteria, the sample size was calculated to be 222 cases.

Related Concepts and Theories

Eco Car comes from the term "Ecology Car" which means a primarily environmentally friendly car. In Thailand, four important European standard requirements are also used:

1) Fuel Economy: Eco cars must be fuel efficient according to regulations. The fuel consumption rate must not exceed five litres per 100 kilometres, or one litre of fuel can be used for 20 kilometres.

2) Environmental Protection: Cars designated as ECO-Cars must meet Euro four emissions standards, meaning carbon dioxide emissions of less than 120 grams per kilometre.

3) Top Security: Eco cars must meet high safety standards according to European safety standards (UNECE 94 and 95), which cover frontal and side collisions.

4) Suitability for Use: Eco cars can be used with both gasoline engines with a capacity not exceeding 13 litres and diesel engines, which are specified to have a size of no more than 1.4 litres. It is expected that diesel engines meeting these criteria will be available shortly.

Marketing Mix Theory

The term "marketing" describes controllable factors or marketing instruments, interested in simultaneously their own and their target consumers' requirements, businesses frequently combine them. The marketing mix often consists only of four elements (4Ps): product, price, place or product distribution route (Place), and marketing promotion (Promotion). Process, Environmental Attributes (Physical Evidence), and People were the subsequent three components developed. It has been referred to as the 7Ps marketing mix, which is summed congruent with key ideas in contemporary marketing, particularly with service businesses. Figure 4 depicts the 7Ps of Services Marketing, Figure 5. Conceptual Framework of the Research.

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Figure 4: The 7Ps of Services Marketing
Source: https://www.bangkokbiznews.com/blogs/columnist/127225

Research Conceptual Framework

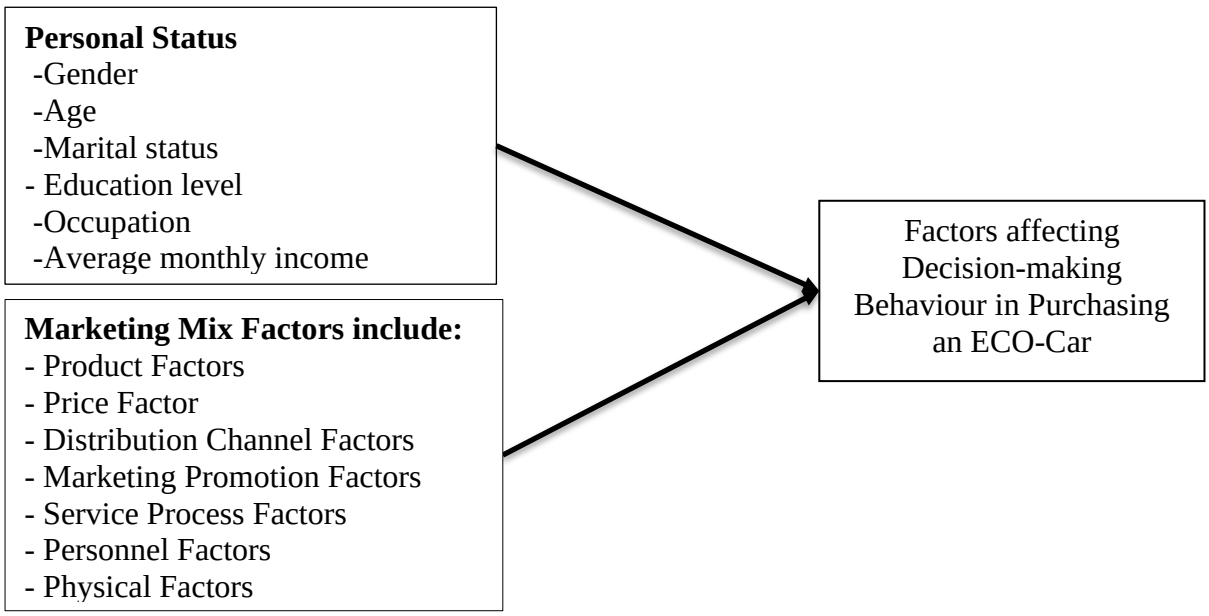

Figure 5: Conceptual Framework of the Research

Methodology

This research is a survey study (Survey Research) aimed at studying marketing mix factors that affect decision-making behaviour in purchasing an ECO-Car and comparing differences according to personal status. The population used in this

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research is the population living in a province in Thailand in 2022 totalling 5,527,994 people and the sample size was determined to obtain a representative sample that can provide reliable information about the population. The sample group was determined using Taro Yamane's sample size calculation formula, it was 222 people with a confidence level of 95 percent, and the error value was within the acceptable range, not exceeding 5 percent. The instrument used to collect data for this research study was the form of a Questionnaire that the researcher collected and improved by studying concepts, theories, and related research. It underwent testing for accuracy content coverage, and correctness in language expressions from experts who have knowledge and experience in the field of study. The questionnaire was reviewed by 3 experts to calculate the confidence value of the questionnaire (reliability) using the Value Cronbach's Alpha Coefficient. The result appeared to be 0.96.

Statistics Used in the Research

This study employs both descriptive and inferential statistical analyses to explore the factors influencing decision-making behavior in purchasing ECO-Cars. Descriptive statistics will be used to examine personal status and marketing mix factors that affect decision-making behavior. This will involve distributing frequencies (Frequency) and calculating percentages (%), means ($\bar{x}$), and standard deviations (Standard Deviation). For inferential statistics, the independent-sample t-Test will be conducted to compare the means of two independent groups to determine if there is a statistically significant difference between them at a significance level of 0.05. This test will analyze whether personal gender status influences decision-making behavior in purchasing ECO-Cars. Additionally, a one-way ANOVA (F-Test) will be used to compare the means of more than two population groups to assess whether there are significant differences at a statistical significance level of 0.05. The p-value will be used to determine whether the mean of the dependent variable differs across groups. This test will examine the relationships between personal factors such as age, marital status, educational level, occupation, and average monthly income, and their impact on decision-making behavior in purchasing ECO-Cars.

Results

From the questionnaire, most respondents were female. They are aged between 31 - 40 years and 41 - 50 years old. They are married. They have a bachelor's degree or equivalent education. Their occupations include being a businessman, running their own business, and working as a private company employee. They have an average monthly income of less than or equal to 20,000 baht. The results of the research in the overall conclusions by the set of research objectives are as follows:

Marketing Mix Factors that affect Decision-Making Behaviour in Purchasing an ECO-Car

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Table 1 highlights the key factors influencing purchasing decision behaviour for eco-cars. The overall rating stands at 4.31, with Product receiving the highest score of 4.39, followed by Personnel at 4.34. Price and Physical Characteristics both score 4.32. Distribution Channel and Service Process are rated at 4.29 and 4.27, respectively, while Marketing Promotion has the lowest score at 4.26. These factors reflect consumers' priorities, emphasizing product quality, personnel interaction, and price considerations in eco-car purchase decisions and Figure 6. Factors affecting purchasing decision behaviour of ECO-Car.

Table 1: Factors affecting decision-making behaviour in purchasing

Factors Affecting Purchasing Decision Behaviour ECO-Car	$\bar{x}$	S.D.	Interpret Results
Overall	4.31	0.40	Highly Agree
Product	4.39	0.41	Highly Agree
Price	4.32	0.42	Highly Agree
Distribution channel	4.29	0.55	Highly Agree
Marketing promotion	4.26	0.51	Highly Agree
Service process	4.27	0.53	Highly Agree
Personnel	4.34	0.47	Highly Agree
Physical characteristics	4.32	0.53	Highly Agree

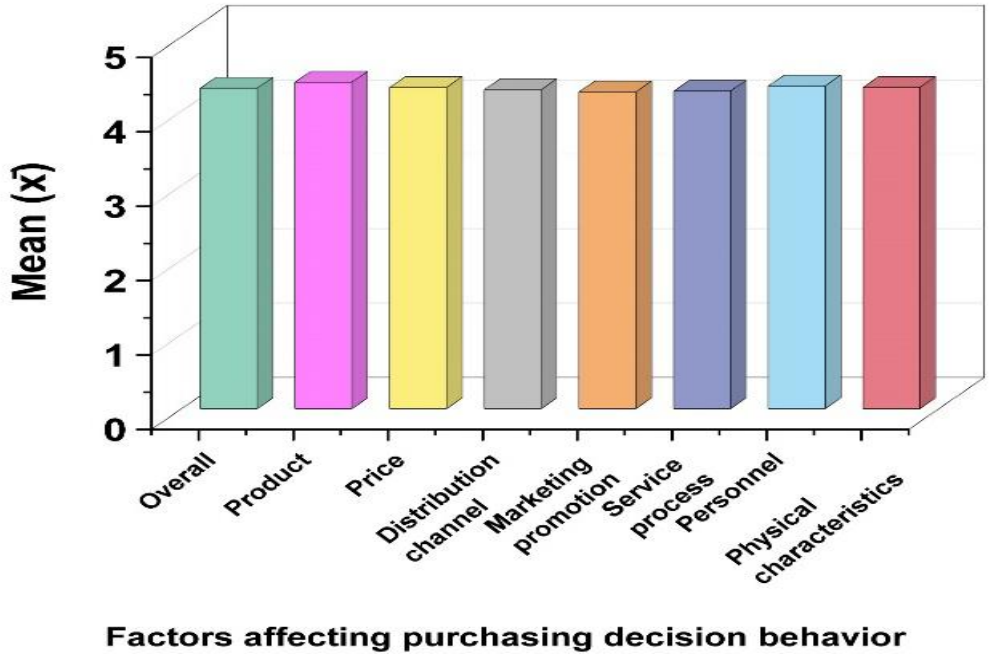

Figure 6: Factors Affecting Purchasing Decision Behaviour ECO-Car

Results of Comparing Personal Factors that affect Decision-Making Behaviour in Purchasing an ECO-Car, classified by Personal Status

Gender

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From Table 2, it is found that the factors affecting decision-making behaviour in purchasing an ECO-Car, overall, are classified according to personal status. In terms of Gender, there is a significant difference at the 0.05 level. When comparing each item, it was found that females had more opinions overall. There were 12 differences in the factors affecting decision-making behaviour in purchasing an ECO-Car. Including: Car safety systems that are reliable and practical, A high fuel economy rate, The selling price of the car being reasonable, Many showrooms and service centres in various areas, Fast when ordering cars, Quick assistance and customer service, An appropriate waiting period for after-sales service, Staff being friendly and enthusiastic in providing services, Staff having expertise in providing automotive advice, Staff having the knowledge and ability to provide accurate and fast service, Staff being attentive to after-sales service, The service centre having quality, standards, and reliability. This table shows the statistics used to compare the differences between the average values of factors affecting the decision-making behaviour of purchasing an ECO-Car overall, classified by personal status in terms of gender.

Table 2: Gender Differences of Purchasing

Gender	Quantity	$\bar{x}$	S.D.	t-Value	p-Value
Male	89	4.23	0.35	-2.50	0.01*
Female	133	4.37	0.42		

*Statistically significant at the .05 level

Age

Comparing the differences in the mean levels of opinions regarding factors affecting decision-making behaviour in purchasing an ECO-Car classified by personal status in terms of Age, it was found that overall, there were significant differences. These differences are statistically significant at the 0.05 level. When comparing each item individually, it was found that there are 29 different factors affecting decision-making behaviour in purchasing an ECO-Car, including: The exterior and interior design characteristics are beautiful, Car safety systems are reliable and practical, The technology system is modern and trustworthy, The car has a high fuel economy rate, The engine has a smooth acceleration rate, Car prices are appropriate for after-sales service, The price of the car is appropriate for its appearance, The price of the vehicle is appropriate for the safety system, Car prices are appropriate for modern technology, Maintenance costs are reasonable, The selling price of the car is reasonable, There are a variety of payment options available, Payment terms are appropriate, There are many showrooms and service centres spread out in various areas, The showroom and service centre offer a complete range of services, Advertising, and public relations media can reach consumer groups, The test drive allows customers to make an immediate decision, There is fast in ordering cars, Punctuality in making appointments for date and time to pick up the vehicle, Quick assistance and customer service, The waiting time for after-sales service is appropriate, The staff are friendly

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and enthusiastic in providing services, The staff have expertise in providing automotive advice, The staff have the knowledge and ability to provide accurate and fast service, The staff dress politely and neatly, The staff are attentive to after-sales service, The service centre has quality standards and reliability, The showroom and service centre have a good, clean, neat, and orderly environment, The showroom and service centre are modern and have complete service facilities. The values for difference in mean level of opinions regarding

Marital Status

A comparison of the differences in the mean levels of opinions regarding factors affecting decision-making behaviour in purchasing an ECO-Car, classified by personal status in terms of Marital Status, found that overall, there is a statistically significant difference at the 0.05 level. When comparing each item, it is found that there are 13 differences in the factors affecting decision-making behaviour in purchasing an ECO-Car. These items include Car safety systems are reliable and practical, The car has a high fuel economy rate, Car prices are appropriate for after-sales service, Has enough showrooms and service centres in many areas, The showroom and s+ervice centre offer a complete range of services, Advertising, and public relations media can reach consumer groups. Fast when ordering cars, Quick assistance, and customer service, the staff are friendly and enthusiastic in providing services, The staff have the knowledge and ability to provide accurate and fast service, The service centre has quality, standards, and reliability, The showroom and service centre has a good, clean, neat, and orderly environment, The showroom and service centre are modern and have complete service facilities.

Educational Level

Comparing the differences in the mean levels of opinions regarding the factors affecting decision-making behaviour in purchasing an ECO-Car, classified by personal status in terms of Educational Level, it was found that overall, there were differences. The difference is statistically significant at the 0.05 level. When comparing each item, it was found that the factors affecting the decision-making behaviour of purchasing an ECO-Car among consumers in Bangkok had 15 significantly different items at the 0.05 level. These items include: The car safety system is reliable and practical, The car has a high fuel economy rate, The selling price of the vehicle is reasonable, There are a variety of payment options available, The payment terms are appropriate, A test drive allows customers to make an immediate decision, It is fast when ordering cars, Quick assistance and customer service, The staff is friendly and enthusiastic in providing services, The staff has expertise in providing automotive advice, The staff has the knowledge and ability to provide accurate and fast service, The staff dress politely and neatly, The service centre has quality standards and reliability, The showroom and service centre have a good, clean, neat, and organized environment, The service centre is standard and reliable.

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Career

A comparison of the differences in the mean levels of opinions regarding factors affecting decision-making behaviour in purchasing an ECO-Car, classified by personal occupational status or Career, found that overall, there was a statistically significant difference at the 0.05 level. When comparing each item, it was found that there were 26 differences in the factors affecting decision-making behaviour in purchasing an ECO-Car. These factors include: The exterior and interior design characteristics are beautiful, Car safety systems are reliable and practical, The technology system is modern and reliable, The car has a high fuel economy rate, Car prices are appropriate for after-sales service, The price of the car is suitable for the safety system, Car prices are appropriate for modern technology, Maintenance costs are reasonable, The selling price of the vehicle is reasonable, There are a variety of payment options available, Payment terms are appropriate, There are many showrooms and service centres in various areas, The showroom and service centre are conveniently located, The showroom and service centre offers a complete range of services, Advertising and public relations media can reach consumer groups, A test drive allows consumers to make an immediate decision, It is fast when ordering cars. Punctuality in making appointments for date and time to pick up the car, Quick assistance and customer service, The waiting period for after-sales service is appropriate, The staff are friendly and enthusiastic in delivering services, The staff have expertise in providing automotive advice, The staff has the knowledge and ability to provide accurate and fast service, The staff dress politely and neatly, The staff are attentive to after-sales service, The service centre has quality standards and reliability.

Average Monthly Income

Comparing the differences in the mean levels of opinions regarding the factors affecting decision-making behaviour in purchasing an ECO-Car, classified by personal status in terms of average Monthly Income, it was found that overall, there was a statistically significant difference at the 0.05 level. When comparing each item, it was found that the factors affecting decision-making behaviours in purchasing an ECO-Car were different in 26 items. These factors include: The safety system in the car is reliable and usable, The technology system is modern and dependable, The car has a high fuel economy rate, The engine has a smooth acceleration rate, Car prices are appropriate for after-sales service, The price of the car is appropriate for the look and feel of the vehicle, The price of the car is suitable for the safety system, Car prices are appropriate for modern technology, Maintenance costs are reasonable, The selling price of the car is reasonable, Have a variety of payment options available, Payment terms are appropriate, Have many showrooms and service centres in various areas, The showroom and service centre offer a complete range of services, Advertising and public relations media can reach consumer groups, A test drive allows consumers to

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make an immediate decision. Fast enough when ordering cars, Punctuality in making appointments for date and time to pick up the vehicle, Quick assistance and customer service, The waiting period for after-sales service is appropriate, The staff are friendly and enthusiastic in providing services, The staff have expertise in providing automotive advice, The staff has the knowledge and ability to provide accurate and fast service, The staff dress politely and neatly, The staff are caring and attentive in after-sales service, The service centre has quality standards and reliability.

Outcome of One-Way ANOVA

To identify the significant differences among personal factors affecting consumers' buying decision behaviours for eco-cars. The variables such as sum of squares (SS), degrees of freedom (df), mean squares (MS), F-value and p-value are representing in outcome of one-way ANOVA (Table 3). **MS outcomes for Personal Factors have Personal** Status (22.66%), Age (26.07%), Marital Status (22.89%), Educational Level (27.64%), Occupation (11.22%), Average Monthly Income (27.44%), Error (3.19). F-values outcomes for Personal Factor have **Personal Status (**3.45%), Age (5.13%) Marital Status (1.98 %), Educational Level (6.78%), Occupation (2.34%), Average and Monthly Income (4.56%). The p-values for Personal Status 0.036*, Age 0.002**, Marital Status 0.167, Educational Level 0.000***, Occupation 0.052, Average Monthly Income 0.014*. Significant factors influencing buying behaviours were identified, guiding targeted marketing strategies for eco-cars based on consumer demographics.

Table 3: Outcome of One-Way ANOVA

Personal Factors	Sum of Squares (SS)	df	Mean Square (MS)	F-Value	P-Value
Personal Status	45.32	2	22.66	3.45	0.036*
Age	78.21	3	26.07	5.13	0.002**
Marital Status	22.89	1	22.89	1.98	0.167
Educational Level	110.54	4	27.64	6.78	0.000***
Occupation	56.12	5	11.22	2.34	0.052
Average Monthly Income	82.33	3	27.44	4.56	0.014*
Error	382.67	120	3.19	-	-

Discussion

The study discussed independent promotion combination factors that influence the managerial behaviour of buying an ECO-Car show that a significant proportion of participants were quite concerned regarding product safety standards. According to the research currently in publication, customers place a high value on eco-car safety features, especially those that is European safety regulations. Customers' increasing

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understanding of the value of dependable vehicle performance is reflected in the emphasis on safety, which probably affects their decision regarding purchase. The difference in occupational backgrounds can affect consumers' perspectives on Eco-Car purchasing, as various professions come with distinct economic conditions, lifestyle choices, and priorities that could influence their purchasing decisions. The findings of a one-way ANOVA show that age, income, educational attainment, and personal status are important determinants of Eco-Car purchase decisions. Targeted marketing tactics that target these groups can increase Eco-Car sales effectiveness and consumer engagement.

Conclusion

In conclusion, the study highlighted the critical factors influencing consumer decision-making behaviour regarding Eco-Cars. The high importance placed on safety standards, along with the significant influence of product and personal factors, suggested that manufacturers and marketers is to prioritize the elements to cater effectively to consumer preferences, the findings point to the potential impact of demographic variables, such as marital status and occupation, on purchasing decisions. Understanding these nuances can help stakeholders better tailor their strategies to meet the assorted needs of consumers in the Eco-Car market. Future research will explore the demographic influences further and examine factors that will affect consumer behaviour in the evolving sector.

Suggestions for Further Study

From this research study, it was found that most respondents prioritize safety standards and fuel efficiency. As a result, entrepreneurs should focus on ensuring the safety of Eco-Car users and emphasize fuel efficiency to boost sales. Additionally, product-related factors were identified as having a significant impact on purchasing behaviour, with respondents placing high importance on these aspects. Entrepreneurs should, therefore, produce Eco-Cars that meet high standards and cater to consumer needs to stimulate higher sales. Furthermore, Eco-Car operators should establish comprehensive service centres to enhance customer convenience, in line with the findings of this research.

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