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Assessing Private Vehicle Use: Necessity or Choice for CEU-M and SBU-M Students

**In Partial Fulfillment of the Requirements for:
ECONOMIC RESEARCH - II**

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Chapter 1

Background of the Study

Students who have an option to use private vehicles when going to University are often faced with the dilemma of whether to utilize them or not. Their decisions are influenced by many factors, such as convenience, cost, and necessity. However, despite the traffic congestion in Manila, increasing costs, parking availability in Mendiola, and such factors, students still choose to use private vehicles when going to university. This study explores the underlying reasons behind private vehicle use among students at San Beda University - Manila and Centro Escolar University - Manila, the two universities in Mendiola that utilizes the mendiola parking grounds the most, seeking to determine whether such usage stems from practical need or personal preference.

Introduction

As time passes, the traffic congestion in Metro Manila continues to worsen, together with the prices of transportation-related costs, such as parking rates and fuel prices. This directly affects students who use private vehicles when going to university, where they must look into the benefits and negative effects of using their vehicles. Given the challenges faced by students residing in distant areas, it is essential to determine why students from universities still prefer to utilize their private vehicles, and determine which factors have the most significant influence on the decision to use a private vehicle for commuting.

Consumer preferences for modes of transportation are heavily impacted by their purchasing power and allowance or income. Guerrero et al. (2023) emphasized that individuals

with higher financial capability tend to prefer private vehicles as they align with their lifestyle and provide a sense of reliability and efficiency. In the context of university students, this research examines whether use of private vehicles among students at the two schools within Mendiola, Centro Escolar University, and San Beda University—is driven by necessity or personal preference.

One of the most important factors in this decision is convenience. Beirão and Cabral (2007) found that potential public transport users prioritize service quality, indicating that convenience significantly influences their choice to switch from private vehicles to public transport. However, despite the efficiencies in public transportation, such as it being cheaper and less worry for parking availability, many students still opt to use their vehicles. This research will apply different factors and variables such as allowance levels, convenience, traffic congestion index, parking availability, behavioral trends, fuel prices, and student performance into this topic to determine which variable impacts the most. Additionally, Hille and Martin (2024) suggest that heavy traffic congestion, while a significant problem in Metro Manila, is not yet a major deterrent to private vehicle use, as consumers still prefer the convenience and comfort of their personal cars over public transportation.

Contributing factors such as fuel efficiency significantly impact consumer choices on vehicle brand and model preferences. Moreover, Guerrero et al. (2023) highlight that rising fuel costs can lead to changes in daily activities and expenses among commuters. However, some individuals still prefer to use private vehicles despite fluctuations in fuel prices, indicating that their preference may be inelastic due to allowance levels or perceived necessity.

Despite such factors, students still prefer to use their vehicles to Mendiola. It begs to answer the question: is using a vehicle a want or a need? Finally, with vehicular utilization, this research also aims to determine the cost of using such transportation, using the Economic Theory of Cost-Benefit Analysis to determine its descriptive statistics. This study is not only limited to one economic theory, more theories will be introduced in the following chapters of this paper.

Statement of the Problem

This study examines the factors influencing private vehicle use among San Beda University - Manila (SBUM) and Centro Escolar University - Mendiola (CEUM) students. It seeks to determine whether private transportation is a necessity or a personal preference, considering key economic, behavioral, and logistical factors.

To address these concerns, the research aims to answer the following questions:

1. What is the profile of the student-respondents in terms of:
 - 1.1. Socio-economic and demographic background
 - 1.1.1. Age
 - 1.1.2. Gender
 - 1.1.3. Year Level in SBUM and CEUM
 - 1.1.4. Weekly Allowance Level
 - 1.1.5. Location of Residence
 - 1.2. Private vehicle usage profile
 - 1.2.1. Frequency of Private Vehicle Use per week
 - 1.2.2. Primary reason for using a private vehicle (necessity or preference)
 - 1.2.3. Monthly Transportation Expenses (Gas Expenses, Parking Fees, etc.,)

1.2.4. Travel Time from residence to Mendiola, Manila

2. What are the perceptions of the respondents on the following factors affecting consumer preferences on private vehicle use:
 - 2.1 Fuel prices
 - 2.2 Parking availability
 - 2.3 Traffic congestion
 - 2.4 Convenience
 - 2.5 Behavioral Trends
 - 2.6 Student Performance
 - 2.7 Allowances
3. How do the perceptions on factors affecting consumer preferences significantly affect their utilization of private vehicles?
4. What policy recommendations can be proposed based on the study's findings?

Objectives of the Study

This study aims to examine the factors influencing students' preference for private vehicle use when traveling to the mentioned universities. By analyzing various economic and behavioral variables, the research seeks to understand how these factors shape transportation choices and their broader implications.

Specifically, this research seeks to:

1. Examine the socio-economic and demographic characteristics of students from San Beda University - Manila and Centro Escolar University - Mendiola that influence their transportation choices.

2. Analyze the key factors affecting students' decisions to use private vehicles, including financial capability, convenience, and the variables mentioned above..
3. Assess the impact of economic factors such as fuel prices, parking fees, and other transportation-related expenses on students' private vehicle usage.
4. Determine whether students' use of private vehicles is mostly driven by necessity or personal preference, considering alternative modes of transportation.
5. Provide policy recommendations for university administrators and relevant government authorities regarding parking management and transportation planning.

Significance of the Study

Understanding the factors influencing private vehicle use among SBU-M and CEU-M students is crucial in addressing transportation challenges within the university area. This study provides insights into whether private vehicle utilization is a necessity or a preference, helping policymakers and University Administrators develop more effective vehicular policies.

The findings from this study will benefit:

Students, by helping them understand which factor affects their decision-making when it comes to utilizing their vehicles, considering every factor so that they can make the right choice.

University Administrators, by identifying potential parking issues within the university and other issues that affect private vehicle use. This study can also help university administrators by considering the possibility of providing students with parking spaces within the university grounds.

Urban Planners and Local Government, by providing data-driven recommendations to enhance sustainable transportation systems and reduce traffic congestion through policy reforms.

Transportation Policymakers, by analyzing the findings from this study, provide data-based solutions that address traffic and fuel consumption.

Scope and Delimitation of the Study

This study is exclusive only to the college students enrolled in Centro Escolar University - Manila and San Beda University - Manila, including those in the College of Law, College of Nursing, College of Medicine, and the College of Arts and Sciences. Faculty, Staff, and Administration are not included in the target population of this research, as well as those from other universities within the University Belt. This study only includes the two universities in Mendiola that mostly utilize the Mendiola street parking.

This study aims to examine factors influencing private vehicle use, with those given such as Allowance Levels, Convenience, Traffic Congestion Index, Parking Availability, and Fuel Prices. It may include other external factors, such as vehicle availability, parental controls, or other factors given to the respondents via the survey or interview.

Lastly, while this research explored the economic and consumer-based aspects of private vehicle usage within students of SBU-M and CEU-M, it does not provide engineering or infrastructure recommendations. This research aims to determine whether students studying in the mentioned universities utilize private vehicles by want, or by need. This also aims to determine what variable students carefully decide on whether to use their vehicles, with the factors mentioned already.

Chapter 2

Review of Related Literature

Understanding the variables affecting SBU-M and CEU-M students' decisions to use private vehicles when going to university is necessary in assessing whether this choice is by need or by want. Various economic, psychological, and environmental factors influence their preferences, specifically in distant areas where transportation is challenging. This chapter reviews relevant studies or literature, specifically on the key variables that influence student preference, such as allowance or income levels, convenience, traffic congestion, fuel prices, and student performance. By examining these variables, this study aims to provide a clearer understanding of the motivations behind students' transportation choices, and what factors positively or negatively affect students.

Allowance/Willingness to pay

Consumer preferences for modes of transportation are heavily impacted by their purchasing power and allowance. People who have more money tend to prefer private vehicles because they are more willing to spend it on options that fit their lifestyles (Guerrero et al., 2023).

According to Singhirunnusorn et al. (2012), the student's allowance has a significant role in determining their transportation choices. The study found that despite initiatives promoting energy-efficient transportation, such as carpool and bicycle sharing, students with a higher allowance choose to afford private transport, prioritizing convenience and personal comfort over

cost-saving alternatives. "For the carpooling, participants use their own automobiles and take-turn on riding a car. Data show that about 40 percent of samples were driving alone and using motorbike as the main choice for traveling to and from the campus". (p. 770). This study shows that if the student has the means, it strongly influences travel behavior, as students with greater allowances are more likely to choose private vehicles.

Literature from Guerrero et al. (2023) and Singhirunnusorn et al. (2012) have strong evidence that students with a larger amount of allowance, which gives them more capacity to pay, choose private vehicles. This suggests that private vehicle use among CEU-M and SBU-M students may be more a matter of financial capacity than necessity.

This variable aligns with Consumer Theory, students' decisions are often constrained or influenced by their financial capacity. Those with higher allowances are more likely to prioritize comfort and convenience, making private vehicle use more accessible.

Convenience

One of the most important factors that affect private vehicle utilization is convenience. This includes comfort, stress levels, impacts on mental and physical self, and more. Beirão and Cabral (2007) found that potential public transport users prioritize service quality, indicating that convenience can significantly influence their choice to switch from private vehicles to public transport.

Hopkins, Bengoechea, and Mandic (2019) found that convenience is a major factor influencing adolescents' preference for private vehicles, as many view car ownership as a way to achieve greater independence and flexibility in their daily commutes. "Seven themes arose as motivation for learning to drive: (1) Driving is better than relying on active or public transport,

(2) Convenience of motorized mobility, (3) The ‘cool factor’, (4) Family dynamics including encouragement, helping with chores, (5) Independence, (6) A skills to report on their CV, and (7) Because it is ‘adult-like’ behaviour“ (p.85).

The study highlighted that students favor private transport due to its thought of freedom, personal comfort, and away from the thought of challenges, such as catching the bus or reliance on parents bringing them to university. “The qualitative focus groups presented a more nuanced picture of preferred mobility, particularly as it related to transport to school. Many students who self-identified as living “too far” from school to use active modes, articulated a desire to use active transport (p. 82). These findings show that convenience affects how students choose to travel and encouraged a growing trend of using private cars instead of sustainable options. Additionally, Onderwater et al. (2019) found that perceived convenience in transportation is strongly influenced by distance to destinations, access to transportation modes, and personal travel preferences. The study revealed that individuals who live in places where industrial institutions are closely accessible and have access to multiple transportation options, such as walking, cycling, and public transit, reported higher levels of convenience in their daily commutes. In contrast, those who utilize public transportation often experience lower convenience due to longer travel distances and traffic congestion. The findings suggest that convenience is also about physical distance, and if a student lives in distant areas, students may choose private vehicles.

Beirão & Cabral (2007), Hopkins et al. (2019), and Onderwater et al. (2019) emphasized that comfort, flexibility, and proximity strongly influence students’ transportation choices. These insights support the current study, suggesting that CEU-M and SBU-M students may prefer

private vehicles because it is less hassle and independent from schedules, especially when faced with distance or limited access to alternatives.

Convenience falls within the Cost-Benefit Analysis and Consumer Theory, convenience represents a perceived benefit that students evaluate against the costs of private vehicle use.

Traffic Congestion

In the Philippines, heavy traffic has always been an issue due to many different reasons, such as road repair, PUV drivers who ignore unloading and loading areas, in which they still unload and load there even if it is now allowed, traffic enforcers, and more. While it affects travel efficiency, Hille and Martin (2024) suggest that it is not yet a major deterrent to private car usage among commuters. This indicates that even in congested urban areas, consumers may still prefer personal vehicles due to convenience, because they feel more comfortable and at ease, over public transportation, where it constantly produces errors and failures and it feels hot and stressful.

Table 6: Chi Square Analysis of Significant Difference between Light and Heavy Vehicular Traffic Roads on Students' Classroom Participation

Vehicular Traffic	N	Active	Passive	df	χ^2	p -value	Decision
Light	50	516	84	1	622.14	.000	Reject
Heavy	45	65	475				

The table shown above is from Istifanus, Nehemiah, and Dakur (2024) with the title “*Vehicular Traffic Congestion and Externalities: Effects on Geography Students' Journey to School and Achievement in Plateau State, North Central Nigeria*”. This table shows that “there is a statistically significant difference between students who traveled through light and heavy vehicular traffic in classroom participation in favour of those who journeyed through light traffic” (p. 1234). They also “found that vehicular traffic congestion significantly impacts

students' school arrival time" (p. 1235). "This finding is in consonance with Mabebe and Emmanuel (2013) who revealed that journey to school led to students' late arrival and tiredness" (p. 1235). Additionally, classroom participation rates were higher on those who experienced less traffic, possibly due to less stress (86% active participation) compared to those in heavily congested routes, who were passive 88% of the time. Academic performance also differed significantly, with students in light-traffic areas scoring an average of 62, while those in heavy congestion areas had a lower mean score of 36.2. These findings suggest that traffic congestion contributes to student fatigue, stress, and reduced academic engagement, ultimately affecting overall performance.

Traffic congestion has been a growing issue in the Philippines, but Hille and Martin (2024) observed that even with traffic issues, there are still many who use private vehicles for comfort and convenience, compared to unreliable public transport. However, the study of Istifanus, Nehemiah, and Dakur (2024) found that heavy traffic negatively affects students' academic performance in general, with those in high-traffic areas showing lower engagement and test scores. This is possibly due to stress that came from being stuck in traffic. This suggests that while congestion does not stop private vehicle use, it contributes to student stress and reduced academic outcomes.

Traffic Congestion falls under Travel Behavior Theory, traffic conditions serve as a situational constraint that impacts students' route choices and vehicle use.

Parking Availability

De Guzman and Diaz (2005) discovered that parking availability plays a key role in students' choice to drive private vehicles to school, especially in universities across Metro

Manila. The study found that “the following variables are found to be significant: parking access inside the school campus, effectiveness of the UVVRP, and the number of cars owned” (p. 1126). The research also highlighted a strong link between car ownership and driving to school, with parking access making this even more likely. These results indicate that providing dedicated parking spaces encourages students to rely on private vehicles, which in turn adds to traffic congestion around university areas.

Another study by Regidor (2006) found that parking availability plays a crucial role in determining private vehicle use, particularly in busy commercial areas where space is limited and demand is high. The study highlighted that trip generation and parking generation are closely linked, as the presence of sufficient parking spaces increases the likelihood of individuals choosing to drive rather than use public transportation. Additionally, findings showed that areas with strict parking regulations or limited parking slots often experience lower vehicle usage rates, suggesting that restricted parking access can serve as a deterrent to private vehicle use. These results emphasize the need for strategic parking management to regulate private car usage and mitigate congestion near high-traffic locations such as universities.

Finally, Al-Alawneh et al. (2023) found that parking availability is a crucial factor influencing students’ decisions to drive alone to campus, particularly in rural university settings where public transportation is difficult to access. “Finding a parking place between 8AM and 9:59 AM is difficult and extremely difficult for 61.1% of the 660 students who drive alone” (p. 219). The study revealed that students who frequently struggled to find parking were more likely to report frustration and lateness to class, which in turn reinforced their reliance on private vehicles. Logistic regression analysis showed that the number of days per week a student

required parking, the time spent searching for a space, and arrival time at campus parking lots significantly affected their likelihood of choosing to drive alone. The findings suggest that parking scarcity and difficulty in securing a space contribute to increased private vehicle use, as students prefer the perceived convenience of personal transportation despite parking challenges.

Parking Availability can be connected to Cost-Benefit Analysis and Travel Behavior Theory, parking availability affects both the cost and practicality of using a private vehicle.

Behavioral Trends

Yellman et al. (2020) found that adolescents' transportation choices are heavily influenced by risk behaviors, driving habits, and external social factors, which can contribute to unsafe driving patterns and increased vehicle use. The study analyzed data from the 2019 Youth Risk Behavior Survey and revealed that “students engaging in one transportation risk behavior were more likely to engage in other transportation risk behaviors: (p. 77). Moreover, the study found that older students were more prone to risky transportation habits, which suggests that the longer a student has access to a private vehicle, the stronger their behavioral attachment to its use becomes. “Increased engagement in driver-related transportation risk behaviors as students become older has been reported in other studies” (p. 80). These findings indicate that behavioral patterns play a significant role in students' reliance on private transportation, as early exposure to vehicle ownership and use tends to reinforce long-term dependence..

Bamberg and Schmidt (2003) found that habitual behavior plays a significant role in students' decisions to use private vehicles for university commutes, often outweighing economic and environmental considerations. The study compared three psychological models—the Theory of Planned Behavior (TPB), the Norm Activation Model (NAM), and the Theory of

Interpersonal Behavior (TIB)—and found that students frequently rely on past behavior and automatic decision-making rather than conscious evaluation of costs and benefits when choosing their mode of transport. Additionally, social norms and personal identity as a car user reinforced habitual driving, making it more resistant to change even when alternative transportation options were available. These findings suggest that behavioral trends, particularly habits and social reinforcement, strongly influence students' preference for private vehicle use, often overriding financial or logistical challenges.

Behavioral Trends is in line with the Theory of Planned Behavior. Behavior reflects attitudes, social influences, and perceived control. This study examines student tendencies, such as habitual car use and peer influence, to understand deeper motivations beyond economic constraints.

Fuel Prices

Fuel prices play a major role in consumer preference, where fluctuations in fuel prices always change every week, either price increase, or price roll-back. Guerrero et al. (2023) highlight that rising fuel costs can lead to changes in daily activities and expenses among commuters. As fuel prices increase, individuals may seek alternatives to use their money, possibly on-demand; however, some individuals still prefer to use private vehicles, possibly due to income or allowance level, which indicates that it is inelastic.

Chang and Lai (2013) found that fuel price increases significantly impact private vehicle usage, with automobile drivers being more responsive to price changes compared to motorcycle riders, this is possibly due to cars having a larger gas tank, compared to motorcycle riders who require low gas expenses. "Automobile drivers consistently have higher willingness than

motorcycle riders to reduce their private vehicle usage reduction on the trips for all activities in response to fuel price” (p. 647). The study revealed that individuals with a strong personal norm for environmentally friendly travel were more likely to reduce private vehicle use when fuel costs rose, suggesting that price hikes on fuel can influence transportation decisions.

Additionally, while some participants opted for alternative transportation methods such as public transit or carpooling, many continued to use their private vehicles, indicating that fuel price sensitivity varies based on income levels and personal attitudes toward convenience. These findings highlight the complexity of fuel price elasticity in transportation choices, particularly among students who balance cost considerations with personal preferences.

Lastly, Eissa (2009) found that rising fuel prices significantly affect students’ transportation choices, particularly among postgraduate students at UKM, where many continue to use private vehicles despite increasing costs. The study revealed that while some students opted for alternative transport methods, such as carpooling or public transit, others maintained their car usage due to the perceived convenience and flexibility it offered. Additionally, the research highlighted that fuel price fluctuations alone are not always enough to deter private vehicle use, as students with higher disposable income showed greater inelasticity in their transportation preferences. “ Convincing reasons for switching to public bus mode transportation by postgraduate students were evaluated based on individual preference. Survey result shows that postgraduate student will switch over to public mode of transportation if; 1) the service is available (24.2%) 2) the fares are cheap (11.9%) 3) the buses are fast (34.6%) 4) they are safe (1.4%) 5) the desirable route are covered (23.7%) 6) they are clean and comfortable (4.2%)” (p. 51). These findings suggest that while fuel costs influence driving behavior, other factors such as

comfort, time efficiency, and accessibility of alternative transportation options play a crucial role in decision-making.

Fuel Prices is backed up by Cost-Benefit Analysis, fluctuating fuel prices are a major determinant of transportation choices. This study considers whether students' use of private vehicles is elastic or inelastic in response to price changes, revealing if car use is truly necessary or discretionary.

Student Performance

Limanond et al. (2011) found that vehicle ownership influences how university students allocate their time, with car-owning students spending less time on academic activities and more time on leisure and social engagements compared to non-owners. The study, which analyzed travel and activity data from 130 engineering freshmen in a rural Thai university, revealed that private vehicle owners had greater flexibility in scheduling trips, allowing them to visit non-academic destinations such as shopping malls and entertainment centers more frequently. However, a regression analysis of cumulative GPA (GPAX) showed that vehicle ownership did not have a statistically significant impact on academic performance, once cognitive ability and gender were controlled for. These findings suggest that while owning a vehicle alters time utilization patterns, it does not necessarily lead to lower academic achievement, although campus policies limiting vehicle use could encourage students to focus more on school-related activities (p. 10).

Additionally, Gyamfi and Opoku (2024) found that vehicle ownership among tertiary students significantly influences their academic engagement and behavioral patterns, often leading to the development of negative habits that may impact academic performance. The study, conducted at Kwame Nkrumah University of Science and Technology (KNUST), revealed that

while car ownership improves student mobility and independence, it also introduces challenges such as increased traffic congestion, lack of parking spaces, and fuel accessibility issues.

Additionally, findings suggest that students who own vehicles tend to prioritize social and leisure activities over academic responsibilities, potentially leading to a decline in academic focus. The research highlights the importance of campus policies aimed at regulating vehicle use to promote a more academically conducive learning environment.

Mlagara (2016) investigated how public transport systems impact academic performance among primary school students in Dar es Salaam, Tanzania. The conclusion showed that students who use public transport often arrive late to school, miss significant lessons, and struggle to complete homework assignments due to long commute times and unsure transport schedules and issues. Additionally, the study found that students who spend excessive time commuting experience fatigue and reduced concentration in class, negatively affecting their academic performance. This literature shows that with poor public transportation, students may consider utilizing private vehicles.

In the previous variable and its literature, Istifanus, Nehemiah, and Dakur (2024) found that student's performance in school is significantly affected by their arrival time. Students in light traffic arrived on time 76% of the time and actively participated in class 86% of the time, while those in heavy traffic were late 79% of the time and passive 88% of the time. Academically, light traffic students scored an average of 62, compared to 36.2 for those in heavy traffic. The study suggests congestion causes fatigue, stress, and lower engagement, harming overall performance.

Student Performance, while underexplored in traditional transportation theories, is integrated into this research to assess how travel modes and time allocation affect academic outcomes.

Chapter 3

Theoretical Framework

This chapter provides the foundation for analyzing the factors that affect the variables within this research. It will include different frameworks, such as theoretical, conceptual, and operational frameworks. assumptions and expectations, hypotheses, and terms will also be included in this chapter to further contribute to the research.

Theoretical Framework

In understanding the dynamics of private vehicle use among students, it is essential to identify and analyze the underlying variables that contribute to their preferences in transportation, and what makes them decide upon it. This study focuses on key factors such as allowance levels, convenience, traffic congestion, parking availability, behavioral trends, fuel prices, and student performance. To better ground the analysis, the study draws upon established theories that explain individual decision-making processes and behavioral patterns related to mobility.

Cost-Benefit Analysis Theory

The Cost-Benefit Analysis (CBA) Theory, as presented by Boardman et al. (2018), is a decision-making framework used to evaluate whether the benefits of a particular action or choice outweigh its associated costs. It is commonly applied in economics, public policy, and business to guide rational decision-making. According to this theory, individuals or institutions assess each option by identifying all relevant costs and benefits, both tangible and intangible, and then comparing them to determine the most beneficial outcome. A decision is considered rational and justified when the perceived benefits exceed the expected costs.

In the context of this study, CBA Theory serves as the guiding principle to understand why students at San Beda University - Manila (SBUM) and Centro Escolar University - Mendiola (CEUM) choose to use private vehicles. Students weigh financial costs—such as fuel prices, parking fees, and vehicle maintenance—against the perceived advantages like convenience, comfort, time efficiency, and flexibility. Despite rising transportation-related costs, many still opt for private vehicle use, indicating that the perceived benefits outweigh the financial burden, or that their usage is driven more by preference than necessity.

In this study, the Cost-Benefit Analysis (CBA) Theory is used to evaluate the reason behind students' decisions to use private vehicles when commuting to San Beda University - Manila and Centro Escolar University - Mendiola. By comparing the costs that come along with it such as fuel, parking, and maintenance with the benefits such as convenience, time efficiency, and comfort, the theory helps explain whether students view private vehicle use as a necessity or a preference. This theory thus serves as a tool to interpret how students economically justify their transportation behavior despite challenges.

Consumer Theory (Utility Maximization)

Students allocate their financial resources (weekly allowance or family support) to afford private vehicle use, depending on whether they view it as a priority expense or a luxury. Beirão & Cabral (2007) highlighted that convenience is a major factor in transportation choices, with students opting for private vehicles due to comfort, reliability, and reduced stress compared to public transport. Guerrero et al. (2023) also found that higher-income individuals are more likely to sustain private vehicle use despite fuel price increases, reinforcing the idea that financial capacity influences transportation choices. Consumer Theory or Utility Maximization helps

explain why students with higher allowances are more likely to prefer private vehicles, prioritizing comfort and status over cost efficiency.

This study will be using Consumer Theory to explain how students allocate their limited financial resources—such as allowances or family support—based on the perceived utility they derive from different transportation options. Students who opt for private vehicles may do so because these offer higher comfort, status, and convenience, despite the costs. The theory helps identify whether vehicle use is a prioritized expense, reflecting how students maximize satisfaction given budget constraints and lifestyle preferences.

Theory of Planned Behavior

Students' attitudes toward private vehicle use are shaped by convenience, status, and reliability, while social norms, peer influence, and family expectations play a role in reinforcing car ownership. Additionally, their perceived control over transportation choices—such as the availability of public transport alternatives, parking spaces, and financial resources—impacts their likelihood of using a private vehicle. Bamberg & Schmidt (2003) found that habitual behaviors and social influences significantly shape students' travel choices, reinforcing long-term dependence on private vehicles. Similarly, Yellman et al. (2020) highlighted that risky transportation behaviors, such as preferring personal vehicles despite congestion, are often influenced by peer norms. Theory of Planned Behavior is relevant in explaining why students continue to use private vehicles despite rising costs and limited parking spaces, as their choices are shaped by habit, peer perception, and perceived convenience.

Their perceived behavioral control such as parking availability, financial capacity, and public transport alternatives, further determines the chances of them using a private vehicle. By

applying this theory, the study will assess how these psychological and social factors interact with practical variables like allowance levels, traffic congestion, and fuel prices, ultimately influencing the students' commuting behavior and its potential effect on academic performance.

Travel Behavior Theory

In Metro Manila, where public transport inefficiencies are prevalent, students may see private vehicle use as a necessity rather than a choice. Onderwater et al. (2019) found that individuals perceive convenience differently based on their access to multiple transportation options. If students feel that public transport is unreliable, they may rely more on private vehicles. Additionally, Istifanus et al. (2024) found that traffic congestion negatively affects student productivity, influencing their preference for private vehicles as a means of controlling their schedules. Travel Behavior Theory helps analyze how traffic congestion, limited public transport access, and university infrastructure contribute to students' dependence on private vehicles.

The Theory of Planned Behavior is used to explore how students' attitudes, social influences, and perceived control affect their choice to use private vehicles. Attitudes toward comfort and reliability, peer norms around car ownership, and perceived ease or difficulty of using alternatives modes of transportation all shape transportation choices. This theory helps analyze how consumer behaviors are driven by internal and external influences, which leads to consistent private vehicle use, even in the face of rising costs.

Conceptual Framework

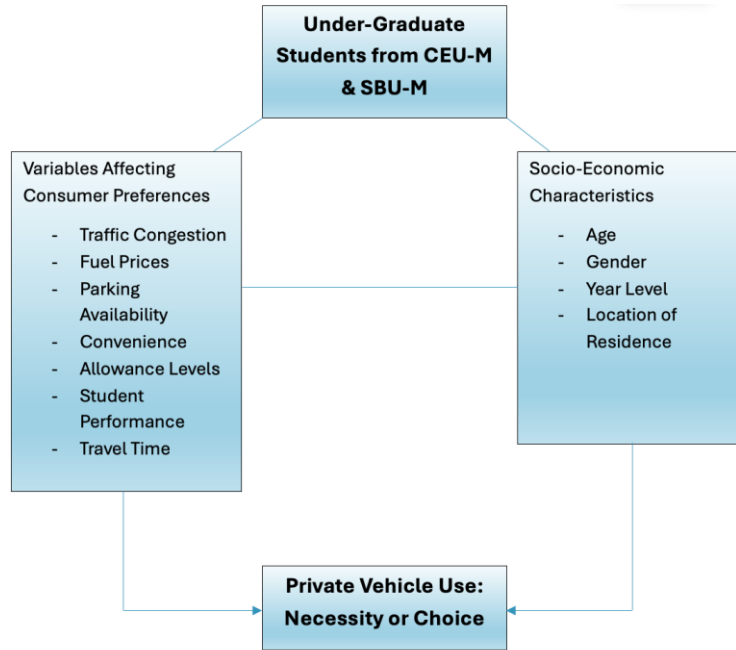


Figure 1: Conceptual Framework of variables affecting private vehicle use among CEU-M and SBU-M students

Operational Framework

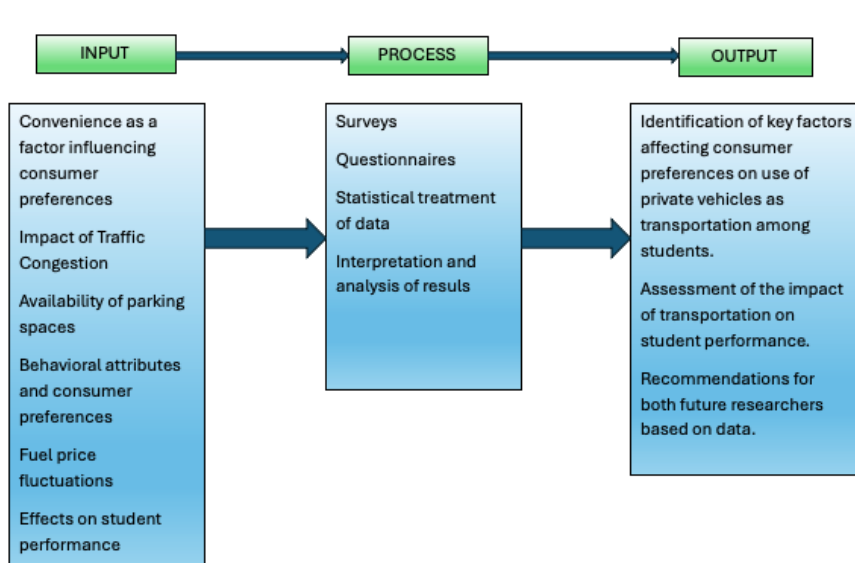


Figure 2: Operational Framework of the study on factors influencing private vehicle use among CEU-M and SBU-M students.

Assumptions

1. Less Parking Availability is strongly significant – Limited parking makes using a private vehicle more difficult, and inconvenient, discouraging students from bringing their cars to school. In Mendiola, where parking is limited and is always reserved by the parking attendants, it is assumed that less parking available in the area will be significant when it comes to decision-making by consumers to utilize their private vehicles to university.
2. Students consider costs and expenses when it comes to utilizing private vehicles as a mode of transportation - It is assumed that when prices rise, it indirectly affects consumer transportation choices by increasing the cost of fuel and commuting expenses.
3. Traffic congestion affects students' time and productivity - The Philippines is considered a country filled with heavy traffic, it is assumed that if heavy traffic congestion happens to students, it leads to decreased school work productivity and increased commute stress. Consumers are expected to adjust their transportation behavior to minimize time lost due to traffic.
4. Transportation choices reflect consumer behavior - It is assumed that consumer decisions regarding transportation follow a rational pattern influenced by perceived behavioral control, subjective norms, and attitudes toward fuel efficiency and travel convenience.
5. Students weigh convenience over costs in some cases - Consistent with economic substitution effects observed in prior studies, it is assumed that when fuel prices or traffic

congestion become too burdensome, consumers will explore alternative transportation options, including public transit, carpooling, or non-motorized transport.

Hypothesis

This section of the paper highlights the null hypotheses for the variables of interest, which will serve as the basis for determining whether the researcher will reject or accept the study's parameters. The researcher will attempt to disprove the null hypothesis to address the primary objectives of the study.

H₀₁: The factors affecting consumer preferences do not significantly affect the preference of student-respondents for private vehicle utilization.

Definition of Terms

Convenience

Refers to how easily and comfortably people can use the service. It includes factors like travel time, ease of access, reliability, comfort, and how well the transport system is integrated with other modes. (OECD, 2014)

Traffic Congestion

Traffic congestion is the rate in which vehicles on the road are heavy, moderate, or light. Heavy traffic congestion occurs when the volume of vehicles exceeds the road's capacity, leading to slower speeds, longer travel times, and increased vehicle queuing (Isarsoft, n.d.).

Parking Availability

The ease with which drivers can find a parking space. It is a key factor in urban planning and transportation, affecting traffic congestion and fuel consumption as drivers spend time looking for parking (Atlas, n.d.).

Behavioral Trends

Patterns in how consumers behave over time. In marketing, this includes shifts in purchasing habits, preferences, and expectations driven by changes in technology, culture, or the economy (Fiveable, n.d.).

Fuel Prices

Fuel price refers to the amount paid for fuel, including costs of transportation and storage. (Law Insider, n.d.).

Mode of Transportation

Category of transport based on the method of travel, such as road, rail, air, or water. Each mode differs in terms of cost, speed, capacity, and environmental impact (DHL Freight Connections, n.d.).

Commuting Behavior

Commuting behavior refers to the habits, choices, and patterns people exhibit when traveling between home and work or school (Zhou, 2020).

Private Transportation

Private transportation involves the use of personally owned vehicles such as cars, motorcycles, or bicycles, offering individual mobility and flexibility (ScienceDirect, n.d.).

Travel time

Time spent travelling from the moment of departure from one activity to the moment of arrival at the new activity (Eurostat, 2019)

Chapter 4

Methodology

This chapter of the paper deals with the methods and procedures used in collecting, analyzing, and interpreting data to address the research problem. It outlines the research design, sampling techniques, target respondents, data collection instruments, and how variables are measured.

Research Design

This study uses a correlational and descriptive research design. It aims to gather measurable data through surveys to analyze the relationship between the variables of this study (e.g., convenience, fuel prices, parking availability, etc.) and students' private vehicle usage if it is a necessity or a choice. This approach allows the researcher to describe trends, assess relationships between variables, and determine whether vehicle use is driven by necessity or preference.

Descriptive

This design is used to provide a detailed account of the current transportation behavior of students from San Beda University–Manila and Centro Escolar University–Mendiola. It allows the researcher to describe the socio-economic and demographic profiles of the respondents, the frequency and purpose of their private vehicle use, and general commuting patterns. Through this, the study can identify common trends, characteristics, such as distance from the nearest available public transportation available, and how it affects preferences among private vehicle users.

Correlational

This design is used to examine the relationship between key variables such as convenience, traffic congestion, parking availability, fuel prices, behavioral preferences, and student performance. It enables the researcher to determine whether and how these factors are associated with students' decisions to use private vehicles. The goal is to understand if private vehicle use is driven more by necessity or personal choice based on the presence or strength of these variables.

Objectives for Data Collections

The data collection process was designed to achieve the following objectives:

- To identify the socio-economic and demographic profile of student-respondents.
- To measure the frequency and purpose of private vehicle use among SBUM and CEU students.
- To assess the influence of convenience, traffic congestion, parking availability, behavioral trends, fuel prices, and student performance on transportation preferences.
- To determine if private vehicle use is perceived as a necessity or a choice.
- To gather relevant information for formulating data-driven policy recommendations.

Sampling Design

The study employs **purposive sampling**, targeting students who regularly use private vehicles to commute to either San Beda University - Manila or Centro Escolar University - Mendiola. This sampling method is appropriate as it focuses specifically on respondents with

direct experience relevant to the study's objectives. Since this research's respondents are students who utilize private vehicles as their main mode of transportation, and the students should be from Centro Escolar University - Mendiola and San Beda University - Mendiola, and the students should be undergraduates from the College of Arts and Sciences, it meets the criteria needed for purposive sampling.

For San Beda University Students:	For Centro Escolar University Students:
Must be enrolled this Academic Year in San Beda University.	Must be enrolled this Academic Year in Centro Escolar University.
Must be a student from the College of Arts and Sciences, College of Law, College of Medicine, or College of Nursing.	Must be an undergraduate student from Centro Escolar University - Manila.
Must utilize a private vehicle at least once a week when going to University and part at Mendiola.	Must utilize a private vehicle at least once a week when going to University and part at Mendiola.
Must not live near Mendiola. Student Respondents must travel at least 5 kilometers when going to University.	Must not live near Mendiola. Student Respondents must travel at least 5 kilometers when going to University.

Table 1: Table Criteria for San Beda and Centro Escolar University Student Respondents in order for respondents to be qualified in this study.

By focusing on this specific group, the researcher can gather relevant and accurate data aligned with the study's objectives

The respondents of the study are undergraduate students enrolled at SBU-M and CEU-Mendiola. Participants must currently use private vehicles as their primary means of transportation to school. The sample includes students from different year levels and programs in San Beda University, and diverse courses in Centro Escolar University-Manila, to ensure diversity in perspectives and commuting experiences.

Measurement and Instrumentation

Data will be gathered through a structured survey questionnaire developed based on the identified variables. The questionnaire includes:

- Demographic Profile Section – Age, gender, year level, weekly allowance, etc.
- Private Vehicle Usage Section – Frequency, purpose, and associated costs.
- Variable Measurement Items – Likert-scale questions assessing levels of convenience, impact of traffic, parking experience, behavioral attitudes, fuel cost sensitivity, and perceived effects on academic performance.

The variables in this study will be measured using a combination of nominal, ordinal, binary, and Likert scales. Socio-economic and demographic factors such as gender and location of residence will be measured using nominal scales, while age, year level, and weekly allowance brackets will be measured using ordinal scales. Private vehicle usage will also include ordinal measurements such as frequency of use per week (rated on a 5-point Likert scale) and distance to Mendiola (rated from very near to very far). Binary scales will be used for identifying whether students consider alternative transportation modes (0 = No, 1 = Yes), while a nominal checklist will identify which transport options are available near their residence (e.g., jeepney, bus, train). All data will be subjected to descriptive and inferential statistical analysis to evaluate relationships and test the hypotheses.

Research Data Collection

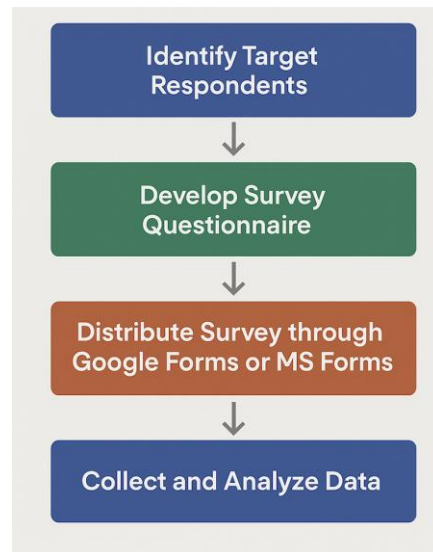


Figure 3. Research Data Collection

Research Ethics

The researcher will ensure that respondents will be informed of the purpose of the study and assured that their participation will be voluntary. The survey included a consent form outlining the nature of the research, ensuring transparency. All collected data are kept confidential and used solely for academic purposes. The study complies with the Data Privacy Act of 2012 (RA 10173) by anonymizing responses (with the researcher being the only one who knows who answered) and securing all digital records through encrypted platforms such as Google Forms or Microsoft Forms.

Data Analysis

The data that will be gathered will undergo both descriptive and correlational statistical analysis. Descriptive statistics will summarize the respondents' demographic profiles and private

vehicle usage patterns through frequency, percentage, and mean computations. Variables such as convenience, fuel prices, and parking availability will be descriptive statistics. Correlational analysis, specifically using Pearson's r , will examine the strength and direction of relationships between variables. These analyses aim to determine whether private vehicle use among students is primarily influenced by necessity or personal choice.

A Multiple Linear Regression model will be used in this study. The respondents will be asked via the survey on how frequent they use their private vehicles when going to Mendiola, where different variables mentioned in this study will be a contributing factor to their preferences. With the help of the statistical advisor, the econometric model for MLR is as follows:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_n X_{ni} + e_i$$

Where:

Y_i = Frequency of private vehicle usage when going to school

X_1 = Necessity coded as 1 if yes and 0 if not

X_2 = Preference coded as 1 if yes and 0 if not

X_3 = Distance of current residence to Mendiola (1-4 likert scale)

X_4 = Convenience

X_5 = Fuel Prices

X_6 = Parking Availability

X_7 = Traffic Congestion

X_8 = Behavioral Attitude

X_9 = Perceived Impact on Academic Performance

e_i = error term

In this study, the null hypothesis will be accepted or rejected based on the results of the multiple linear regression analysis. If the p-values of one or more independent variables—such as convenience, fuel prices, parking availability, traffic congestion, behavioral trends, student performance, or Travel Time—are found to be less than 0.05, this indicates that these factors have a statistically significant effect on the frequency of private vehicle use. In such case, the null hypothesis will be rejected, meaning that at least one of the factors significantly influences students' preference for using private vehicles. On the other hand, if all the independent variables have p-values equal to or greater than 0.05, the null hypothesis will not be rejected, suggesting that none of the variables significantly affect private vehicle utilization among the student-respondents.

Sample Questionnaire

I. SOCIO-ECONOMIC & DEMOGRAPHIC BACKGROUND

A. Age

- 17–18
- 19-20

- 21-22
- 23 and above

B. Gender

(0) Male (1) Female

☐ 0 ☐ 1

- **Others (Please Specify):** _____

C. University Enrolled to

- San Beda University - Manila
- Centro Escolar University - Mendiola

D. Year Level

- 1st Year
- 2nd Year
- 3rd Year
- 4th Year

E. Weekly Allowance

- Below ₱500
- ₱501–₱1000
- ₱1001–₱1500
- ₱1501–₱2000
- Above ₱2000

F. Current Residence (Barangay/City): _____

II. PRIVATE VEHICLE USAGE

1. How often do you use a private vehicle to go to school?

(1 = Always, 4 = Rarely)

☐ 1 ☐ 2 ☐ 3 ☐ 4

2. What is your primary reason for using a private vehicle?

☐ Necessity

☐ Preference

☐ Both

☐ Other (please specify): _____

3. Monthly Transportation Expenses (Gas, Parking, Toll, etc.):

☐ ₱0–₱500

☐ ₱501–₱1000

☐ ₱1001–₱1500

☐ ₱1501–₱2000

☐ Above ₱2000

4. How far is your current residence from Mendiola, Manila?

(1 = Very Near, 4 = Very Far)

☐ 1 ☐ 2 ☐ 3 ☐ 4

- 5. On average, how long does it take you to travel from your residence to school when using a private vehicle?**

(Check all that apply)

☐ 15 - 30 minutes

☐ 31 - 45 minutes

☐ 46 - 60 minutes

☐ More than 1 hour

- 6. Travel time affects my decision to bring a private vehicle to school**

(1 = Strongly Agree, 4 = Strongly Disagree)

☐ 1 ☐ 2 ☐ 3 ☐ 4

III. PERCEPTIONS ON FACTORS AFFECTING VEHICLE USE

Rating Scale

1 – Strongly Agree

2 – Agree

3 – Disagree

4 – Strongly Disagree

Please rate the following statements based on your personal experience:

Statement	1	2	3	4
I prefer using a private vehicle because it saves me time.				
I use a private vehicle because public transportation is unreliable.				
I use a private vehicle because of safety and comfort.				
Fuel prices influence how often I bring my vehicle to school.				
Parking availability near school affects my decision to drive.				
Traffic congestion makes me reconsider using a private vehicle				
My allowance can cover the costs of driving to school regularly.				
Using a private vehicle helps me be more productive academically.				
I bring my vehicle even if it costs more than public transport because it is more convenient.				

IV. QUESTIONS

1. Why do you personally choose to use or not use a private vehicle when commuting to school?
2. What changes (in costs, policies, traffic, etc.) would influence you to stop or start using a private vehicle?

Chapter V

Results and Discussion

This chapter presents the key outcomes of the study, focusing on three main aspects: (1) if the variables indicated by the researcher was found to be statistically significant, (2) tests conducted from the data collected, and (3) the acceptance or rejection of the null hypothesis. This chapter begins by outlining the socio-economic and employment characteristics of the graduate respondents. This is followed by a justification of the assumption tests conducted to determine the most suitable statistical approach, whether parametric or non-parametric. Finally, the chapter provides a comprehensive interpretation and discussion of the statistical results.

Reliability Test

Table 1. Cronbach Alpha

	Cronbach Alpha Test
Assessing Private Vehicle Use: Necessity or Choice for CEU-M and SBU-M Students	1.089 or <u>1</u>

The reliability test of the instrument used in this study yielded a Cronbach's Alpha coefficient of 1.089, which is approximately equal to 1.00. This value indicates an excellent level of internal consistency and reliability among the survey items. In general, a Cronbach's Alpha value above 0.70 is considered acceptable, while values close to 1.00 suggest that the instrument consistently measures what it is intended to measure. The result therefore confirms that the questionnaire items designed to assess private vehicle use among Centro Escolar University -

Manila and San Beda University - Manila students were highly consistent in capturing respondents' perceptions and behaviors.

This reliability rate confirms the accuracy and dependability of the gathered data. The consistency across the responses implies that the survey statements were clearly understood and aligned with the study's objectives, reducing the likelihood of random error. Hence, the high Cronbach's Alpha supports that the tools used in the research are statistically sound and suitable for interpreting relationships between students' demographic profiles, private vehicle usage patterns, and perceptions. This establishes a strong foundation for the credibility of the study's findings and subsequent analyses in Chapter 5.

Since the constructs used in the survey were based on factors commonly linked to mobility behavior—such as convenience, cost, and travel conditions—the high reliability score supports the validity of subsequent analyses. Similar studies emphasize the importance of consistent measurement when examining transport choice determinants (Bamberg & Schmidt, 2003).

Socio-economic and Demographic Background of Respondents

Table 2. Socio-economic and Demographic Background of Respondents using purposive sampling

AGE	Total Frequency (n = 60)	% of Total
21-22	41	68.3%
19-20	9	15%
23 and above	6	10%

17-18	4	6.7%
GENDER		
Male	38	63.3%
Female	21	35%
Gay	1	1.7%
UNIVERSITY ENROLLED TO		
San Beda University - Manila	39	65%
Centro Escolar University - Mendiola	21	35%
YEAR LEVEL		
4th year	37	61.67%
3rd year	10	16.67%
2nd year	8	13.33%
1st year	5	8.33%
WEEKLY ALLOWANCE		
Above 2000	19	31.67%
1001-1500	18	30%
1501-2000	9	15%
501-1000	9	15%
Below 500	5	8.33%

The socio-economic and demographic results show that the majority of respondents were aged 21–22 years old (68.33%), followed by those aged 19–20 years (15%), while smaller proportions were 23 years and above (10%) and 17–18 years old (6.67%). In terms of gender, most were male (63.33%), while female students accounted for 35%, and 1.67% identified as

gay. The data also reveal that San Beda University–Manila students made up 65% of the total respondents, while Centro Escolar University–Mendiola students represented 35%. For year level, the majority were fourth-year students (61.67%), followed by those in third year (16.67%), second year (13.33%), and first year (8.33%).

When it comes to financial capacity, most respondents had a weekly allowance above ₱2000 (31.67%), followed by ₱1001–₱1500 (30%), ₱1501–₱2000 (15%), ₱501–₱1000 (15%), and below ₱500 (8.33%). These findings suggest that respondents are mostly upper-year male students with sufficient allowances to manage transportation costs. The predominance of older college students indicates that many are at an age where they have access to family-owned or personally used vehicles. This aligns with the study’s framework of determining whether vehicle usage among students is driven by necessity or personal preference, as those with higher allowances and vehicle access are more likely to use private transportation by choice rather than seeing it as a necessity.

This demographic distribution aligns with previous studies that found students with greater financial capacity and increasing independence demonstrate higher access to private transport (Singhirunnusorn et al., 2012). Access to regular allowance increases the ability to maintain personal transportation costs, which strengthens the preference for private vehicle use over public modes (Guerrero et al., 2023). Older students also tend to have greater autonomy in mobility decisions, with driving often regarded as part of adult independence (Hopkins et al., 2019).

Private Vehicle Usage

Table 3. Private Vehicle Usage

Private Vehicle Usage	1 - Rarely	2 - Sometimes	3 - Often	4 - Always
How often do you use a private vehicle to go to school?	19 31.67%	19 31.67%	12 20%	10 16.67%
What is your primary reason for using a private vehicle?	Convenience and Comfort	Avoid Public Transpo Issues	Travel Time Efficiency	Necessity
	26 43.33%	20 33.33%	8 13.33%	6 10%
Monthly Transportation Expenses (Gas, Parking, Toll, etc.)	Below P1000	1001-2000	2001-3000	Above P3000
	9 15%	14 23.33%	16 26.67%	21 35%
How far is your current residence from Mendiola, Manila	Below 5KM	5-10KM	11-15KM	Above 15KM
	10 16.67%	18 30%	19 31.67%	13 21.67%
On average, how long does it take you to travel from your residence to school when using a private vehicle?	Below 15 Minutes	16-30 minutes	31-45 minutes	46 minutes and above
	7 11.67%	15 25%	21 35%	17 28.33%
Travel time affects my decision to bring a private vehicle to school.	Strongly Agree	Agree	Disagree	Strongly Disagree
	13 21.67%	14 23.33%	19 31.67%	14 23.33%

The findings on private vehicle usage indicate that respondents mostly use their vehicles on an occasional basis, with 31.67% saying they use them “rarely” and another 31.67% saying

“sometimes.” Meanwhile, 20% reported using them “often,” and 16.67% said “always.” This pattern reveals that while private vehicles are accessible to many students, they are not the primary mode of transportation for most. The main reason gathered from the survey for vehicle use was convenience and comfort (43.33%), followed by avoiding public transport issues (33.33%), travel time efficiency (13.33%), and necessity (10%). This suggests that vehicle use is primarily preference-based, not out of obligation. Additionally, many respondents spend ₱2001 to above ₱3000 per month (61.67% combined) on transportation-related expenses, highlighting that driving comes with significant costs.

In terms of distance, a large portion of respondents lived 11–15 kilometers (31.67%) and 5–10 kilometers (30%) away from Mendiola, with 21.67% residing beyond 15 km. Travel time results show that 35% spend 31–45 minutes commuting, and 28.33% spend 46 minutes or more, reflecting the traffic congestion common in Manila. Most respondents traveled between 5 KM and 15 KM to reach school, and 63.33% spent at least 30 minutes commuting. Research suggests that students living farther from school perceive private vehicles as more convenient because they reduce reliance on less predictable modes (Onderwater et al., 2019). However, 55% of respondents disagreed that travel time alone influences their decision to bring a private vehicle, indicating that convenience, comfort, and independence may outweigh travel delays, consistent with earlier findings where traffic congestion did not significantly reduce car use (Hille & Martin, 2024).

The last question under Private Vehicle Usage shows that a large amount of respondents (31.67%) disagreed that travel time affects their decision to bring a private vehicle to school, while 23.33% strongly disagreed. This suggests that, for more than half of the students, travel time alone is not a major determinant of private vehicle use. On the other hand, 21.67% strongly

agreed and 23.33% agreed, indicating that a substantial portion of respondents still view travel time as an influential factor. Overall, while travel time plays a role for some students, the results imply that other considerations—such as parking availability, convenience, or comfort—carry greater weight in driving the decision to use private vehicles.

Findings show that most students use private vehicles only occasionally, with 31.67% selecting “rarely” and another 31.67% selecting “sometimes.” Only 16.67% reported using private vehicles regularly. The leading motivation for using a car was convenience and comfort (43.33%), followed by dissatisfaction with public transport (33.33%). This mirrors earlier literature stating that convenience and ease strongly influence private vehicle choice, especially when public transportation is viewed as stressful or inconsistent (Beirão & Cabral, 2007; Hopkins et al., 2019).

Many respondents also incur transportation expenses exceeding ₱2,000 monthly, supporting past findings that individuals with higher financial means tend to continue using private vehicles despite costs (Chang & Lai, 2013; Guerrero et al., 2023).

Perceptions on Factors Affecting Private Vehicle Use

Table 4. Perceptions on Factors Affecting Private Vehicle Use

Statement No.	Statement	Strongly Agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)	Weighted Mean	Verbal Interpretation
1	I prefer using a private vehicle	11	22	22	5	2.35	STRONGLY AGREE

	because it saves me time.						
2	I use a private vehicle because public transportat ion is unreliable.	19	15	12	14	2.35	STRONGLY AGREE
3	I use private vehicle because of safety and comfort.	20	25	7	8	2.05	AGREE
4	Fuel prices influence how often i bring my vehicle to school.	22	18	15	5	2.05	AGREE
5	Parking Availabilit y near school affects my decision to drive.	26	15	9	10	2.05	AGREE
6	Traffic congestio n makes me reconsider using a private vehicle.	28	17	3	12	1.98	AGREE
7	My allowance	35	10	7	8	1.80	AGREE

	can cover the costs of driving to school regularly.						
8	Using a private vehicle helps me be more productive academically.	36	13	5	6	1.68	AGREE
9	I bring my vehicle even if it costs more than public transport because of convenience.	38	15	1	6	1.58	AGREE

The perception results, when interpreted using the correct scale where 1 corresponds to “Strongly Agree” and 4 to “Strongly Disagree,” reveal a generally positive perception toward private vehicle use. The two statements with the highest mean scores—“I prefer using a private vehicle because it saves me time.” (2.35) and “I use a private vehicle because public transportation is unreliable” (2.35)—were interpreted as Strongly Agree, suggesting that both travel time and unreliability of public transportation are major factors influencing students’ decision to drive. This is consistent with the literature found in Chapter 2 where convenience is a major determinant of private car preference (Beirão & Cabral, 2007; Hopkins et al., 2019). Parking access has long been recognized as a major determinant of student car use, particularly in Metro Manila university environments (De Guzman & Diaz, 2005; Regidor, 2006). Even

when parking is difficult, many students continue to drive, viewing private vehicles as offering more control over their mobility, a pattern also found in rural university contexts (Al-Alawneh et al., 2023).

Meanwhile, the remaining statements—“I use a private vehicle because of safety and comfort”, “Fuel prices influence how often I bring my vehicle,” “I use a private vehicle because public transportation is unreliable”, and “Parking availability near school affects my decision to drive”—all had mean scores between 2.05 and 2.35, which are interpreted as Agree and Strongly agree. This implies that respondents generally acknowledge these factors as influencing their vehicle use to some degree, though prior studies found that congestion does not strongly discourage private car use due to perceived personal comfort advantage (Hille & Martin, 2024).

Taken together, these results indicate that students agree or strongly agree with most perception statements, emphasizing that private vehicle use is strongly associated with comfort, safety, convenience, and control over travel time. Thus, rather than being a mere luxury, private vehicle use among CEU-M and SBU-M students appears to be a practical response to urban transport challenges, such as traffic congestion and unreliable public transit options.

Test of Hypothesis

Table 5. Test of Hypothesis

Hypothesis	Statement	Result
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Null Hypothesis (H_{01})	The factors affecting consumer preferences do not significantly affect the preference of student-respondents for private vehicle utilization.	Reject
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Based on the analyzed survey data, the findings indicate that most respondents agreed or strongly agreed that factors such as convenience, safety, comfort, parking availability, and fuel prices influence their decisions to use private vehicles. The descriptive results show that the highest-rated variables were travel time ($WM = 2,35$) and public transportation unreliability ($WM = 2.35$), both interpreted as *Strongly Agree*. Other variables, including parking availability ($WM = 2.05$) and traffic congestion ($WM = 1.98$), also showed agreement.

Given these consistent positive responses, the null hypothesis (H_{01}) stating that the identified factors do not significantly affect the students' preferences for private vehicle utilization is rejected. Related Literature supports this outcome, with data gathering results to higher income, comfort, and reduced dependence on public transportation strongly encourage private vehicle use ((Singhirunnusorn et al., 2012; Beirão & Cabral, 2007; Hopkins et al., 2019).

The results confirm that the factors mentioned significantly influence students' transportation decisions. Therefore, private vehicle usage among CEU-M and SBU-M students is not random or incidental—it is driven by measurable and significant considerations such as perceived convenience, safety, and practicality despite financial costs and traffic conditions.

Table 6. Ordinary Least Squares (Linear Regression)

Predictor Variable	Coefficient	Std. Error
I use a private vehicle because public transportation is unreliable.	0.314	0.177*
I use a private vehicle because of safety and comfort.	0.098	0.181
Fuel prices influence how often I bring my vehicle to school.	-0.205	0.150
Parking availability near school affects my decision to drive.	-0.0329	0.155**
Traffic congestion makes me reconsider using a private vehicle.	0.082	0.164
My allowance can cover the costs of driving to school regularly.	-0.220	0.162
Using a private vehicle helps me be more productive academically.	0.178	0.185
I bring my vehicle even if it costs more than public transport because it is more convenient.	0.125	0.203

Predictor Variable	Coefficient	Std. Error
I use a private vehicle because public transportation is unreliable.	0.314	0.177*
Constant	2.089	0.526***

Statistic	Value
Observations	60
R ²	0.268
Adjusted R ²	0.153
Residual Std. Error	0.989 (df = 51)
F-Statistic	2.331** (df = 8, 51)

- $p < 0.1 \rightarrow *$
- $p < 0.05 \rightarrow **$
- $p < 0.01 \rightarrow ***$
- Dependent Variable: *How often do you use a private vehicle to go to school?*

The results of the Ordinary Least Squares (OLS) regression revealed that the model is statistically significant, as indicated by an F-statistic of 2.331. The R² value of 0.268 suggests that approximately 26.8% of the variation in students' private vehicle use is explained by the independent variables included in the study, such as fuel prices, parking availability, traffic

congestion, behavioral trends, and convenience. Among these, parking availability was found to be statistically significant, indicating that limited parking strongly influences students' decision to drive to the university. Other predictors showed positive but non-significant effects, indicating that while students recognize fuel prices, traffic, and convenience as influential, these did not quantitatively predict driving frequency. Similar findings exist in research showing that fuel cost sensitivity varies and often does not deter students from driving if they value personal convenience (Chang & Lai, 2013; Guerrero et al., 2023). This highlights the importance of logistical factors in shaping transportation choices among students from San Beda University – Manila and Centro Escolar University – Mendiola.

Table 7. Shapiro-Wilk Normality Test

Normality Test	W = 0.9829	0.5605	P > 0.05 (normally distributed)
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The Shapiro–Wilk test ($W = 0.9829$, $p = 0.5605$) confirmed that the residuals are normally distributed, satisfying the assumption of normality. This means that the data used in the regression model follow a normal pattern, allowing for valid statistical inference and ensuring that the model's predictions are reliable.

Table 8. Breusch-Pagan Heteroskedasticity Test

Heteroskedasticity	BP = 8.788 (8)	0.3605	P > 0.05 (No evidence of Heteroskedasticity)
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The Breusch–Pagan test ($BP = 8.788$, $p = 0.3605$) showed no presence of heteroskedasticity, suggesting that the variance of the residuals remains constant across all

observations. This indicates that the model's error terms are stable and that the regression coefficients are efficient and unbiased, reinforcing the robustness of the OLS results.

Table 9. Variance Inflation Test

VIF	Range: 1.46 - 3.16	-	VIF < 5 (No multicollinearity concern)
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Finally, the Variance Inflation Factor (VIF) values ranged between 1.46 and 3.16, confirming that there is no multicollinearity between the independent variables. This implies that each variable contributes independently to explaining students' private vehicle use and that the relationships identified are not distorted by overlapping effects. Overall, the diagnostic tests confirm that the model meets the key econometric assumptions, ensuring its credibility in explaining the determinants of private vehicle use among university students. Below are the VIF Values by Predictor;

Table 9.1 VIF Values by Predictor

Independent Variable	VIF
I use a private vehicle because public transportation is unreliable.	1.46
I use a private vehicle because of safety and comfort.	1.76
Fuel prices influence how often I bring my vehicle to school	1.82
Parking availability near school affects my decision to drive.	1.75
Traffic congestion makes me reconsider using a private vehicle.	2.17

My allowance can cover the costs of driving to school regularly.	1.54
Using a private vehicle helps me be more productive academically	2.00
I bring my vehicle even if it costs more than public transport because it is more convenient.	3.16

Table 10. Relationship between Dependent and Independent Variables

Variable	Type	Statistical Relationship	Interpretation based on Findings
Private Vehicle Usage	Dependent Variable	n/a	Represents how often students use a private vehicle to go to school. The regression model explained 26.8% of its variation through the tested factors.
Public Transportation Reliability	Independent Variable	Statistically Significant ($p < 0.1$)	Students are more likely to use private vehicles when they perceive public transportation as unreliable. This shows that dissatisfaction with public transit increases private vehicle dependence.
Safety and Comfort	Independent Variable	Not Significant	Although not statistically significant, students strongly <i>agree</i> that safety and comfort influence their decision to drive, indicating a psychological and practical preference rather than a purely

			measurable one.
Fuel Prices	Independent Variable	Not Significant	Despite expectations, changes in fuel price did not significantly affect private vehicle use, suggesting that student drivers prioritize convenience over cost.
Parking Availability	Independent Variable	Statistically Significant ($p < 0.05$)	Limited parking availability near school discourages private vehicle use. This supports that logistical constraints like parking strongly influence students' driving decisions.
Traffic Congestion	Independent Variable	Not Significant	Traffic congestion does not significantly reduce vehicle usage, indicating that students tolerate delays for convenience and comfort.
Allowance Level	Independent Variable	Not Significant	Although many students have higher weekly allowances, income did not significantly predict vehicle use, implying that comfort and convenience outweigh cost considerations.
Academic Performance	Independent Variable	Not Significant	Students who feel more productive when using private vehicles show a positive but insignificant

			relationship, suggesting self- perceived benefits rather than measurable behavioral outcomes.
Convenience over Cost	Independent Variable	Not Significant	Students agree that convenience justifies cost, but the relationship is not statistically strong. This suggests that while they value comfort, it is not the sole determinant of usage.

Respondents subjectively reported that travel time and comfort influence their preference for private vehicles. However, the regression analysis showed that parking availability and public transport reliability are the most statistically significant predictors. This means convenience may not be a stand-alone factor, but rather the result of having accessible parking and weak public transport service. The survey captured perceived factors, while the model identifies the underlying measurable causes.

Chapter VI

Summary, Conclusions, and Recommendations

This chapter presents the summary of the whole study. It draws conclusions based on the results of data analysis and theoretical frameworks used, emphasizing whether private vehicle use among CEU-M and SBU-M students is a necessity or a matter of choice. Finally, it offers practical recommendations for students, university administrators, policymakers, and future researchers to address transportation behavior, mobility challenges, and sustainable transport practices within the university setting.

Summary

This study, entitled “*Assessing Private Vehicle Use: Necessity or Choice for CEU-M and SBU-M Students*,” aimed to determine whether the use of private vehicles among university students in Mendiola, Manila, is driven by necessity or choice. Specifically, it examined how socioeconomic and behavioral factors, such as allowance, convenience, traffic congestion, parking availability, and comfort, affect the decision to use private vehicles. The study also sought to identify the demographic characteristics of the respondents and the perceptions influencing their mode of transportation.

The research utilized a quantitative descriptive method, employing a structured survey questionnaire distributed to students of San Beda University–Manila (SBU-M) and Centro

Escolar University–Mendiola (CEU-M). A total of 60 respondents participated, representing varying ages, year levels, and weekly allowances. The instrument's reliability coefficient of 1.089 confirmed its strong internal consistency and accuracy in measuring students' perceptions. The model was supported by theories such as Consumer Theory, Cost-Benefit Analysis, and travel behavior frameworks, which propose that transportation choices are shaped by perceived utility, constraints, and habit formation (Bamberg & Schmidt, 2003).

The overall findings led to the rejection of the null hypothesis (H_{01}), which stated that factors affecting consumer preferences do not significantly influence private vehicle utilization. The data proved otherwise, demonstrating that convenience, safety, and comfort significantly shape transportation behavior. Grounded on the theories mentioned in Chapter 4, the study concluded that student transportation choices are deliberate and rational, shaped by perceived benefits and available resources.

Socio-Demographic Profile of Respondents

The results show that private vehicle users are predominantly:

- **Aged 21–22 years old (68.33%)**, which indicates that most respondents were upper-year college students who are more likely to have access to family-owned or personally used vehicles.
- **Male students (63.33%)**, suggesting higher vehicle access among male students.
- **Fourth-year students (61.67%)**, consistent with the assumption that older students have greater transportation autonomy.
- **Students with weekly allowances above ₱2,000 (31.67%)**, implying financial capacity to sustain vehicle-related expenses.

- **Mostly from San Beda University–Manila**, comprising 65% of total respondents.

These findings solidify that private vehicle usage is more common among financially capable, older students who have greater access to private vehicles. Earlier studies suggest that income and age correlate with increased vehicle access, as financially capable students tend to choose private transport for greater independence and mobility convenience (Singhirunnusorn et al., 2012; Hopkins et al., 2019). The data reinforces this trend, showing that the likelihood of car use increases as students gain more financial capacity, autonomy, and exposure to university commuting patterns.

Private Vehicle Usage Pattern

Survey responses showed that:

- **63.34% use private vehicles either rarely or sometimes**, while 36.67% report frequent or regular use.
- **The primary reason for using private vehicles is convenience and comfort (43.3%)**, followed by avoiding issues with public transportation (33.3%).
- **Most students spend over ₱3,000 monthly** on fuel, parking, and related costs, highlighting a relatively high transportation budget.
- **Distances between home and school typically range from 5–15 km**, which is a moderate travel radius where private vehicle usage may save time.
- **Travel time significantly affects students' decision to bring a vehicle**, reinforcing the importance of time efficiency.

Econometric Test Results

The Ordinary Least Squares (OLS) regression model was statistically significant ($F = 2.331$), with 26.8% of the variation in private vehicle usage explained by the included predictors.

Among all independent variables:

- **Parking availability is a statistically significant variable**, meaning that difficulties in securing parking strongly influence driving decisions.
- **Public Transportation Reliability** is also a statistically significant variable.
- **Other factors** such as fuel prices, allowance level, and perceived convenience were not statistically significant, although they contributed directionally to the model.

Consistent with earlier research, areas with ample parking encourage greater private vehicle use, while those with limited parking reduce the likelihood of car commuting (De Guzman & Diaz, 2005; Regidor, 2006). Likewise, weak and inconsistent public transport systems push commuters toward private modes, especially when personal comfort and travel independence are priorities (Beirão & Cabral, 2007).

All assumption tests in Chapter 5 confirmed the robustness of the OLS model:

- Residuals were normally distributed
- No multicollinearity
- No autocorrelation
- No heteroskedasticity

These results validate the reliability of the statistical interpretation.

Conclusions

Based on the overall analysis, private vehicle usage among students of San Beda University–Manila and Centro Escolar University–Mendiola is **primarily a matter of choice rather than strict necessity**.

Although students often cite public transportation inefficiencies and traffic issues as concerns, these factors did not demonstrate strong statistical significance in the regression analysis. Instead:

- Parking availability emerged as the strongest determinant of vehicle usage, implying that students drive when they are confident they can park conveniently.
- The socio-demographic profile—financial capacity, age, and student seniority—suggests that students who use private vehicles generally have the means and flexibility to choose this mode of transport.

Thus, private vehicle use is better interpreted as a **preferred transportation choice driven by comfort, convenience, and lifestyle**, rather than economic or infrastructural necessity.

Students with higher allowances and access to personal or family-owned vehicles tend to drive not because public transportation is impossible, but because private vehicles provide faster, more predictable, and more comfortable commuting conditions within Manila’s constrained urban transportation environment.

Regression Analysis

The regression analysis shows that students' driving behavior is shaped by both structural and personal factors. Parking availability serves as a direct logistical determinant, while public transport reliability shapes perceptions of alternative mobility options. Together, these findings indicate that private vehicle preference reflects an interplay between accessibility, system efficiency, and perceived travel security, consistent with travel behavior models that emphasize the role of environmental and habitual factors in shaping transport decisions (Bamberg & Schmidt, 2003).

Recommendations

In light of the conclusions, the following recommendations are presented:

1. For University Administrators

- Establish or improve dedicated parking facilities and implement efficient vehicle entry systems to address limited space and congestion.
- Consider providing student shuttle services or university carpool programs to encourage shared travel among students.
- Strengthen institutional campaigns promoting sustainable mobility, integrating transportation management into campus policy.

2. For Students

- Evaluate personal transportation choices in terms of both cost efficiency and environmental impact.
- Practice ride-sharing or carpooling with peers to minimize fuel costs and reduce carbon footprint.

- Utilize public transportation whenever possible to help alleviate congestion in the Mendiola district.

3. For Local Government Units (LGUs)

- Coordinate with educational institutions to develop student-centered mobility policies, such as regulated parking zones and improved road management.
- Encourage the development of alternative transport systems, such as bike lanes or e-shuttle routes, especially around university areas.
- Support programs that promote traffic discipline and sustainable commuting practices among students and residents.

4. For Future Researchers

- Expand the scope of study to include more universities in the University Belt area to generalize findings on student transport preferences.
- Conduct comparative analyses of private versus public transport behavior to explore socioeconomic and environmental implications.
- Examine additional factors such as fuel price volatility, vehicle ownership trends, and urban planning policies to deepen the understanding of transport decision-making.

Implications of the Study

The study highlights that private vehicle use among students is shaped by socioeconomic privilege, behavioral motivations, and perceived convenience. The findings can guide universities and policymakers in creating more equitable and sustainable mobility programs. This research contributes to the growing body of urban transport economics, showing that even

among students, transport behavior mirrors broader economic principles of choice and utility. It encourages awareness among young citizens about how individual mobility decisions collectively affect urban efficiency and environmental sustainability.

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Appendix 1*Reliability Test: Cronbach's Alpha*

DESCRIPTIONS	VALUES	
# OF VARIABLES	12	
SUM OF ITEM VARIANCE	0.07776820988	
VARIANCE OF TOTAL SCORE	50.84888889	
CRONBACH ALPHA	1.089240656	
ROUNDED UP TO NEAREST	1	EXCELLENT

Cronbach Alpha Test

1.089 or 1

Assessing Private Vehicle Use: Necessity or

Choice for CEU-M and SBU-M Students

Appendix 2

Consent Form and Survey Questionnaire

Assessing Private Vehicle Use: Necessity or Choice for CEU-M and SBU-M Students

My name is **Dwayne Sedrick Encinares**, a 4th year Student under the Department of Economics and Public Policy, in San Beda University, conducting my undergraduate thesis. This survey questionnaire is a partial fulfillment for our Thesis subject. This study aims to understand why students from San Beda University – Manila and Centro Escolar University – Mendiola use private vehicles. It explores whether private transportation is a necessity or a personal preference by analyzing factors such as convenience, traffic, parking, fuel prices, behavior, and academic performance.

Your responses will be used solely for academic and research purposes. In accordance with the **Data Privacy Act of 2012 (RA 10173)**, all information you provide will be treated with strict confidentiality and will not be shared or used for any purpose other than this study. Participation is voluntary, and you may withdraw at any time without penalty.

San Beda University

College of Arts and Sciences
 Department of Economics and Public Policy
 Mendiola, Manila

INFORMED CONSENT FORM

You are invited to participate in the research entitled **"Assessing Private Vehicle Use: Necessity or Choice for CEU-M and SBU-M Students"**. By choosing to participate, you acknowledge that:

Your participation is voluntary.

You may refuse to answer any question or stop at any time without penalty.

Your responses will be kept confidential and used only for academic purposes.

You may request a summary of the research upon its completion.

For any questions or concerns, you may contact Dwayne Sedrick Encinares, **2022-1780@sanbeda.edu.ph**.

Do you agree to participate in this study?

☐ Yes

☐ No

I. SOCIO-ECONOMIC & DEMOGRAPHIC BACKGROUND

1. Age
 - 17-18
 - 19-20
 - 21-22
 - 23 and above
2. Gender
 - Male
 - Female
 - Other: _____
3. University Enrolled to:
 - San Beda University - Manila
 - Centro Escolar University - Mendiola
4. Year Level
 - 1st year
 - 2nd year
 - 3rd year
 - 4th year
5. Weekly Allowance

- Below 500
 - 501 - 1000
 - 1001 - 1500
 - 1501 - 2000
 - Above 2000
6. Current Residence
- Answer: _____

II. PRIVATE VEHICLE USAGE

1 = Always, 2 = Often, 3 = Sometimes, 4 = Rarely

1. How often do you use a private vehicle to go to school?
 - 1
 - 2
 - 3
 - 4
2. What is your primary reason for using a private vehicle?
 - Necessity
 - Preference
 - Both
3. Monthly Transportation Expenses (Gas, Parking, Toll, etc.)
 - 0 -500
 - 501 - 1000
 - 1001 - 1500
 - 1501 - 2000
 - Above 2000
4. How far is your current residence from Mendiola, Manila?

1 = Very Near, 2 = Near, 3 = Far, 4 = Very Far

 - 1
 - 2
 - 3
 - 4
5. On average, how long does it take you to travel from your residence to school when using a private vehicle?
 - 15 - 30 minutes
 - 31 - 45 minutes
 - 46 - 60 minutes
 - More than 1 hour
6. Travel time affects my decision to bring private vehicle to school.

1 = Strongly Agree, 2 = Agree, 3 = Disagree, 4 = Strongly Disagree

 - 1
 - 2
 - 3
 - 4

III. PERCEPTIONS ON FACTORS AFFECTING PRIVATE VEHICLE USE

1 = Strongly Agree, 2 = Agree, 3 = Disagree, 4 = Strongly Disagree

1. I prefer using a private vehicle because it saves me time
 - 1
 - 2
 - 3
 - 4
2. I use a private vehicle because public transportation is unreliable
 - 1
 - 2
 - 3
 - 4
3. I use a private vehicle because of safety and comfort
 - 1
 - 2
 - 3
 - 4
4. Fuel prices influences how often I bring my vehicle to school.
 - 1
 - 2
 - 3
 - 4
5. Parking availability near school affects my decision to drive
 - 1
 - 2
 - 3
 - 4
6. Traffic Congestion makes me reconsider using a private vehicle
 - 1
 - 2
 - 3
 - 4
7. My allowance can cover the costs of driving to school regularly
 - 1
 - 2
 - 3
 - 4
8. Using a private vehicle helps me be more productive academically
 - 1
 - 2
 - 3
 - 4
9. I bring my vehicle even if it costs more than public transport because it is more convenient
 - 1

- 2
- 3
- 4

IV. QUESTION

1. Why do you personally choose to use or not use a private vehicle when commuting to school?
2. What changes (in costs, policies, traffic, etc.) would influence you to stop or start using a private vehicle?

Appendix 3.

Google Colab: Running Econometric Tests


```
install.packages("tidyverse")
install.packages("readxl")      # for .xlsx files from PSA
install.packages("ggplot2")
install.packages("lmtest")
install.packages("readr")
install.packages("dplyr")
```

```
library(tidyverse)
library(readxl)
library(ggplot2)
library(lmtest)
library(readr)
library(dplyr)
```

Installing package into ‘/usr/local/lib/R/site-library’
(as ‘lib’ is unspecified)

Installing package into ‘/usr/local/lib/R/site-library’
(as ‘lib’ is unspecified)

Installing package into ‘/usr/local/lib/R/site-library’
(as ‘lib’ is unspecified)

Installing package into ‘/usr/local/lib/R/site-library’
(as ‘lib’ is unspecified)

Installing package into ‘/usr/local/lib/R/site-library’
(as ‘lib’ is unspecified)

Installing package into ‘/usr/local/lib/R/site-library’
(as ‘lib’ is unspecified)

```
data <- read_csv("Assessing Private Vehicle Use- Necessity or Choice for CEU-M and SBU-M Students-2.csv")
head(data)
```

```
Rows: 60 Columns: 26
— Column specification —————
Delimiter: ","
chr (14): Timestamp, San Beda University
College of Arts and Sciences
Depart...
dbl (12): How often do you use a private vehicle to go to school?, How far i...

# Use `spec()` to retrieve the full column specification for this data.
# Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

A tibble: 6 × 26

Timestamp	San Beda University College of Arts and Sciences Department of Economics and Public Policy Mendiola, Manila	Name	Age	Gender	University Enrolled to:	Year Level	Weekly Allowance	Current Residence	How often do you use a private vehicle	I use a private vehicle because	I use a private vehicle because of safety	Fuel prices influence how often I bring my car	av r
	INFORMED CONSENT FORM You are invited to participate in the research entitled "Assessing Private Vehicle Use: Necessity or Choice for CEU-M and SBU-M Students". By choosing to participate, you acknowledge that: Your participation is voluntary. You may refuse to answer any question or stop								"	because public transportation		..	d

```

modell1 <- lm(
  `How often do you use a private vehicle to go to school?` ~
    `I use a private vehicle because public transportation is unreliable.` +
    `I use a private vehicle because of safety and comfort.` +
    `Fuel prices influence how often I bring my vehicle to school.` +
    `Parking availability near school affects my decision to drive.` +
    `Traffic congestion makes me reconsider using a private vehicle` +
    `My allowance can cover the costs of driving to school regularly.` +
    `Using a private vehicle helps me be more productive academically.` +
    `I bring my vehicle even if it costs more than public transport because it is more convenient.`,
  data = data
)

```

```
summary(modell1)
```

Call:

```

lm(formula = `How often do you use a private vehicle to go to school?` ~
  `I use a private vehicle because public transportation is unreliable.` +
  `I use a private vehicle because of safety and comfort.` +
  `Fuel prices influence how often I bring my vehicle to school.` +
  `Parking availability near school affects my decision to drive.` +
  `Traffic congestion makes me reconsider using a private vehicle` +
  `My allowance can cover the costs of driving to school regularly.` +
  `Using a private vehicle helps me be more productive academically.` +
  `I bring my vehicle even if it costs more than public transport because it is more convenient.`,
  data = data)

```

Residuals:

```

      Min       1Q   Median       3Q      Max
-1.95049 -0.71085 -0.08225  0.58860  2.07416

```

Coefficients:

	Estimate
(Intercept)	2.08946
`I use a private vehicle because public transportation is unreliable.`	0.31430
`I use a private vehicle because of safety and comfort.`	0.09766
`Fuel prices influence how often I bring my vehicle to school.`	-0.20519
`Parking availability near school affects my decision to drive.`	-0.32925
`Traffic congestion makes me reconsider using a private vehicle`	0.08172
`My allowance can cover the costs of driving to school regularly.`	-0.22028
`Using a private vehicle helps me be more productive academically.`	0.17776
`I bring my vehicle even if it costs more than public transport because it is more convenient.`	0.12484
	Std. Error
(Intercept)	0.52633
`I use a private vehicle because public transportation is unreliable.`	0.17693
`I use a private vehicle because of safety and comfort.`	0.18098
`Fuel prices influence how often I bring my vehicle to school.`	0.14972
`Parking availability near school affects my decision to drive.`	0.15453
`Traffic congestion makes me reconsider using a private vehicle`	0.16408
`My allowance can cover the costs of driving to school regularly.`	0.16166

```

`My allowance can cover the costs of driving to school regularly.`      0.16166
`Using a private vehicle helps me be more productive academically.`      0.18545
`I bring my vehicle even if it costs more than public transport because it is more convenient.` 0.20325
t value
(Intercept)                      3.970
`I use a private vehicle because public transportation is unreliable.`    1.776
`I use a private vehicle because of safety and comfort.`                  0.540
`Fuel prices influence how often I bring my vehicle to school.`          -1.370
`Parking availability near school affects my decision to drive.`          -2.131
`Traffic congestion makes me reconsider using a private vehicle`          0.498
`My allowance can cover the costs of driving to school regularly.`        -1.363
`Using a private vehicle helps me be more productive academically.`       0.959
`I bring my vehicle even if it costs more than public transport because it is more convenient.` 0.614
Pr(>|t|)
(Intercept)                      0.000226
`I use a private vehicle because public transportation is unreliable.`    0.081621
`I use a private vehicle because of safety and comfort.`                  0.591808
`Fuel prices influence how often I bring my vehicle to school.`          0.176546
`Parking availability near school affects my decision to drive.`          0.037967
`Traffic congestion makes me reconsider using a private vehicle`          0.620562
`My allowance can cover the costs of driving to school regularly.`        0.178973
`Using a private vehicle helps me be more productive academically.`       0.342322
`I bring my vehicle even if it costs more than public transport because it is more convenient.` 0.541782

(Intercept)                      ***
`I use a private vehicle because public transportation is unreliable.`    .
`I use a private vehicle because of safety and comfort.`                  .
`Fuel prices influence how often I bring my vehicle to school.`          *
`Parking availability near school affects my decision to drive.`          *
`Traffic congestion makes me reconsider using a private vehicle`          .
`My allowance can cover the costs of driving to school regularly.`        .
`Using a private vehicle helps me be more productive academically.`       .
`I bring my vehicle even if it costs more than public transport because it is more convenient.` .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9894 on 51 degrees of freedom
Multiple R-squared:  0.2678,    Adjusted R-squared:  0.1529

```

Residual standard error: 0.9894 on 51 degrees of freedom
 Multiple R-squared: 0.2678, Adjusted R-squared: 0.1529
 F-statistic: 2.331 on 8 and 51 DF, p-value: 0.03235

Appendix 5.

Google Colab Econometric Test: Ordinary Least Squares (OLS)

```
install.packages("stargazer")
library(stargazer)
```

```
stargazer(model1, type = "text", title = "OLS Regression Results: Private Vehicle Usage")
```

```
Installing package into '/usr/local/lib/R/site-library'
(as 'lib' is unspecified)
```

```
OLS Regression Results: Private Vehicle Usage
```

```
-----
`I use a private vehicle because public transportation is unreliable.`
```

```
`I use a private vehicle because of safety and comfort.`
```

```
`Fuel prices influence how often I bring my vehicle to school.`
```

```
`Parking availability near school affects my decision to drive.`
```

```
`Traffic congestion makes me reconsider using a private vehicle`
```

```
`My allowance can cover the costs of driving to school regularly.`
```

```
`Using a private vehicle helps me be more productive academically.`
```

```
`I bring my vehicle even if it costs more than public transport because it is more convenient.`
```

```
Constant
```

```
-----
Observations
R2
Adjusted R2
Residual Std. Error
F Statistic
```

```
=====
Note:
```

`How often do you use a private vehicle to go to school?`

0.314*
(0.177)

0.098
(0.181)

-0.205
(0.150)

-0.329**
(0.155)

0.082
(0.164)

-0.220
(0.162)

0.178
(0.185)

0.125
(0.203)

2.089***
(0.526)

60

0.268

0.153

0.989 (df = 51)

2.331** (df = 8; 51)

=====
*p<0.1: **p<0.05: ***p<0.01

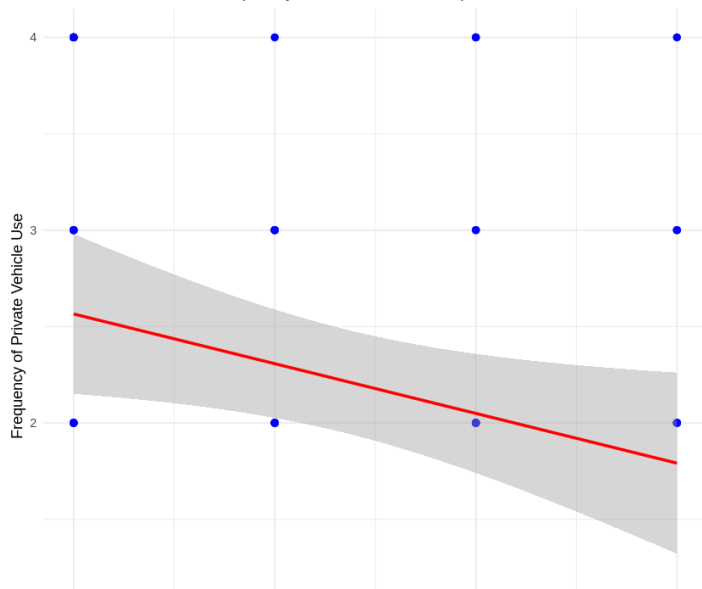
Appendix 6.

Google Colab: OLS Plot, Scatter, and Regression Line

```
library(ggplot2)
```

```
ggplot(data, aes(x = `Fuel prices influence how often I bring my vehicle to school.`,
                 y = `How often do you use a private vehicle to go to school?`)) +
  geom_point(color = "blue", size = 2) + # scatter points
  geom_smooth(method = "lm", se = TRUE, color = "red") + # regression line
  labs(
    title = "Private Vehicle Use Frequency vs Fuel Price Perception",
    x = "Perception: Fuel Prices Influence Vehicle Use",
    y = "Frequency of Private Vehicle Use"
  ) +
  theme_minimal()
```

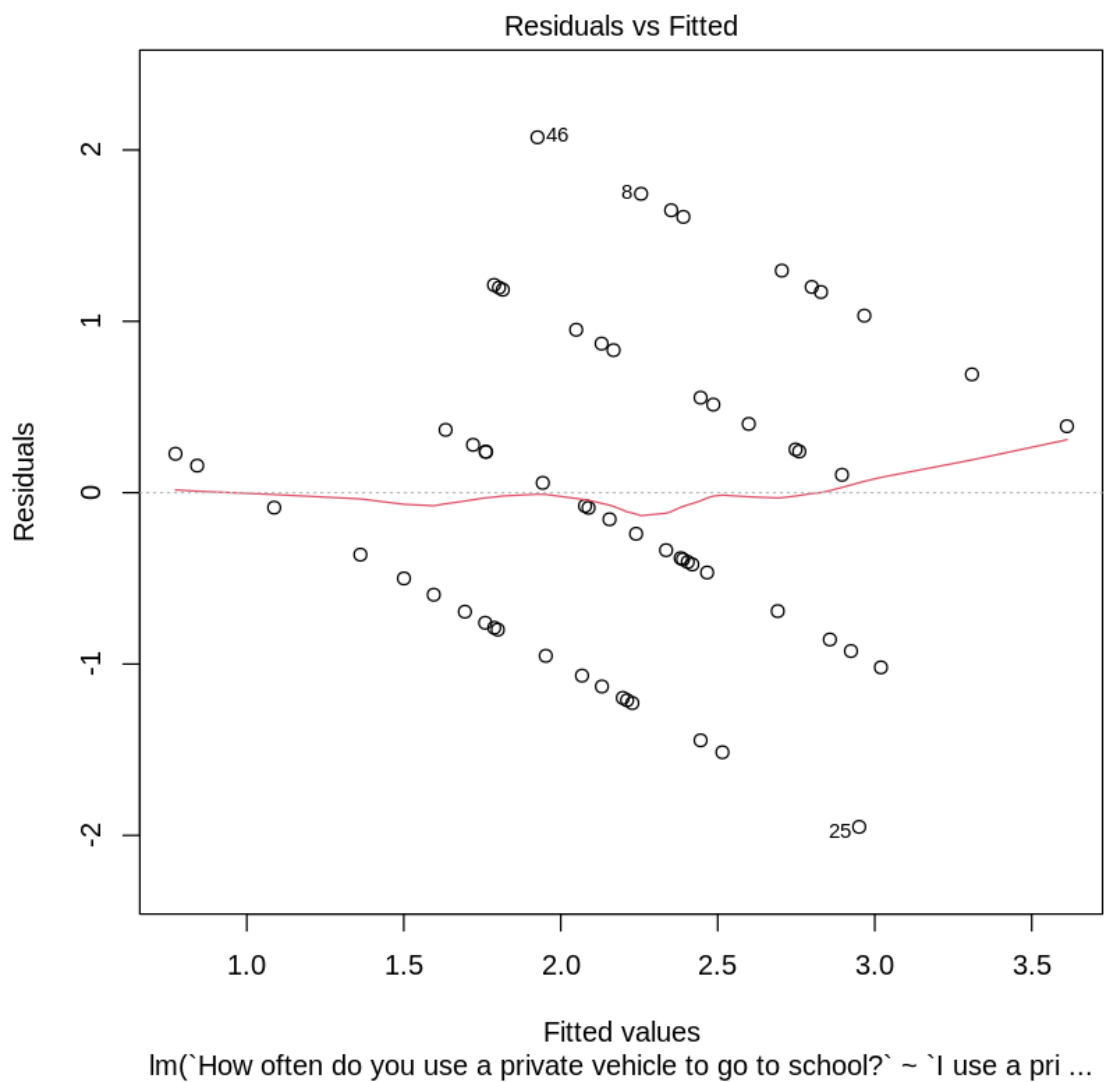
```
`geom_smooth()` using formula = 'y ~ x'
Private Vehicle Use Frequency vs Fuel Price Perception
```



Appendix 7.

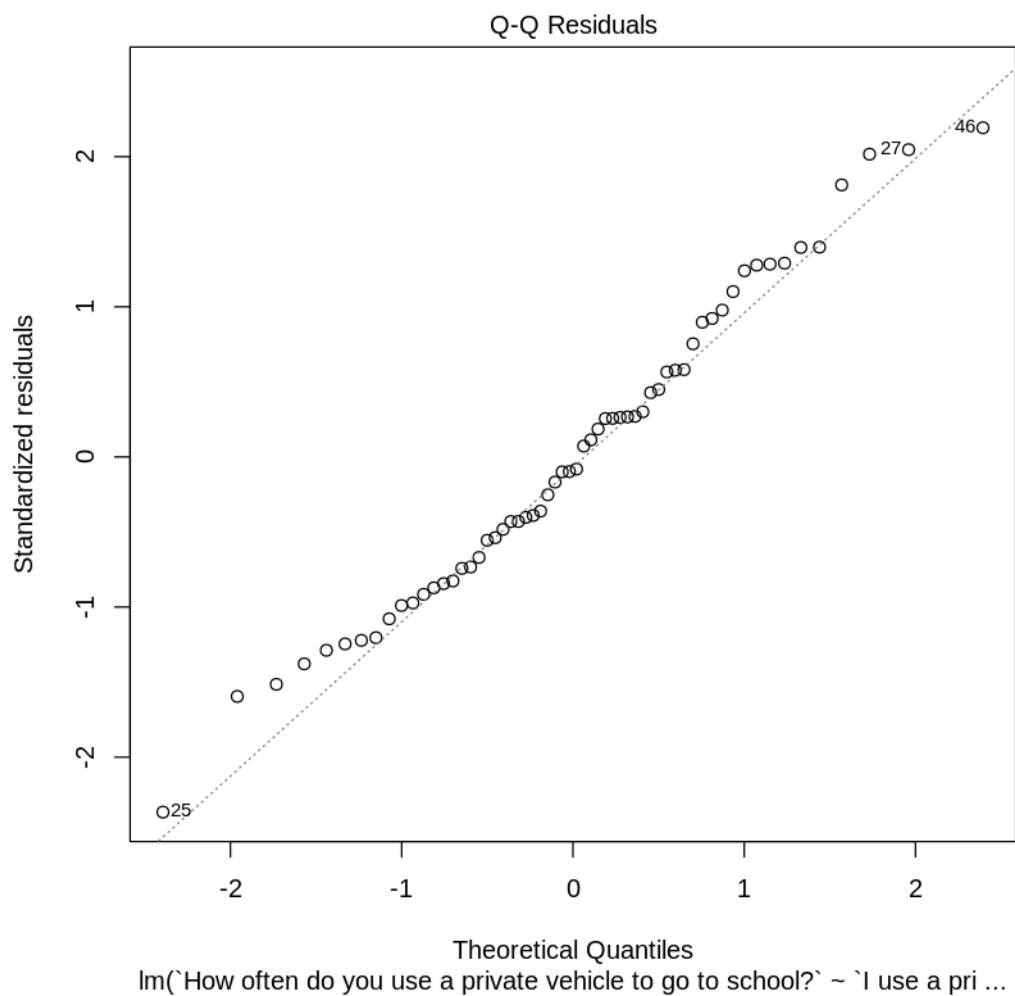
Google Colab: Residuals and Fitted Values

```
plot(model1, which = 1)
```



Google Colab: Standardized Residuals, Theoretical Quantities

```
plot(model1, which = 2)
```



Shapiro-Wilk Normality Test

```
shapiro.test(resid(model1)) #Shapiro Wilk Test
```

Shapiro-Wilk normality test

```
data:  resid(model1)
W = 0.98286, p-value = 0.5605
```

Shapiro-Wilk Normality Test

Normality Test	W = 0.9829	0.5605	P > 0.05 (normally distributed)
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Appendix 10.*Breusch-Pagan Heteroskedasticity Test*

Heteroskedasticity	BP = 8.788 (8)	0.3605	P > 0.05 (No evidence of Heteroskedasticity)
---------------------------	----------------	--------	--

`bptest(model1)`

studentized Breusch-Pagan test

data: model1

BP = 8.7877, df = 8, p-value = 0.3605

Appendix 11.

Variance Inflation Test

```
vif(model1)
```

```

'I use a private vehicle because public transportation is unreliable.': 1.45974823658569 'I use a private vehicle because of safety and comfort.': 1.75930783683088
'Fuel prices influence how often I bring my vehicle to school.': 1.82400010918657 'Parking availability near school affects my decision to drive.': 1.74668081996676
'Traffic congestion makes me reconsider using a private vehicle': 2.17210517364901 'My allowance can cover the costs of driving to school regularly.': 1.53899491720527
'Using a private vehicle helps me be more productive academically.': 1.99729354956112
'I bring my vehicle even if it costs more than public transport because it is more convenient.': 3.15859447503377

```

Variance Inflation Test

VIF	Range: 1.46 - 3.16	-	VIF < 5 (No multicollinearity concern)
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Appendix 12.

VIF Values by Predictor

VIF Values by Predictor

Independent Variable	VIF
I use a private vehicle because public transportation is unreliable.	1.46
I use a private vehicle because of safety and comfort.	1.76
Fuel prices influence how often I bring my vehicle to school	1.82
Parking availability near school affects my decision to drive.	1.75
Traffic congestion makes me reconsider using a private vehicle.	2.17
My allowance can cover the costs of driving to school regularly.	1.54
Using a private vehicle helps me be more productive academically	2.00

15

I bring my vehicle even if it costs more than public transport because it is more convenient.	3.16
---	------