Review on change in travel behavior with respect fuel price hike/variation

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ABSTRACT

A country's growth and economy are considerably influenced by transportation system. Due to rapidly increasing population and travel demand, transportation planning is becoming necessary. Since the primary element affecting vehicle operating costs and transit rates is fuel pricing so fuel price fluctuations can cause people to adjust their activity and travel behavior. The implications of energy pricing have been examined in this paper; primarily in terms of how they affect various aspects of travel behavior both in short and long term. In short term People may temporarily change their driving habits, departure times, preferred modes of transportation, preferred routes, and or preferred destinations. But in the long run, consumers might think about getting a more compact or energy-efficient vehicle.

Keywords: Travel Behavior, Fuel price variation effect, Passenger transport, travel fare

1. INTRODUCTION:

Road transportation is more adaptable than other forms of transportation since it doesn't require specialized equipment or skills to utilize it, therefore all nations, regardless of how backward, have access to it in some capacity. In more developed areas, they are more likely to be well-made and suited for the heaviest and most advanced vehicles. In more rural areas, they may be simple pieces only fit for foot or hoof traffic. Modes of road transportation are Walking, Automobile, Cycling, Bus, Heavy-duty vehicle, Non-motorized transport etc.

We frequently want to place blame for our suffering at the pump when the price of gasoline and diesel increases. The oil sector is, in fact, a complicated market. There are four elements that have the biggest impact on fuel prices, even if there are many other factors that could also have an impact, such as the weather, governmental policies, and international relations. These elements include the price of crude oil, the profits and costs of refining, the price of distribution and marketing, and gasoline taxes. The rising cost of gasoline and its impact on the economy are major sources of concern. Although these stories are not based on any thorough investigation, there has been a lot of media attention in how rising gasoline prices have affected the demand for public transportation [1]. The rise in fuel prices has a direct impact on economic growth and planning across all sectors, including the transportation industry. Thus, it is believed that the increase in gasoline prices will alter commuters' perceptions of public transportation use, especially among students; who rely primarily on scholarships and loans for financial support [2]. The transportation industry is also the main source of air pollution and generates a significant amount of demand for non-renewable

resources like fossil fuels. In addition, the rapid increase in the usage of private vehicles harms the environment and causes social problems like traffic congestion and health difficulties [3]

Travel behaviour can be conceptualized as a collection of realized actions in response to the availability of transportation resources and a context that promotes travel. Travel behaviour can be utilized to learn which form of transportation individuals prefer, why they choose it, the most well-liked destinations, and why they go there.

Since the users of private vehicles have no other option, they might change their travel patterns to be in accordance with the amount of income they have. They also may have to change their mode of private transport from car to motorcycle [4]. Impacts of (permanent) changes in gasoline taxes are examined, and it is discovered that higher gasoline taxes are linked to stronger shifts toward high fuel-efficiency vehicles and greater decreases in gasoline use than comparable increases in the tax exclusive retail price. For car miles driven, they could not discover a comparable pattern. Additionally, they discovered that fuel taxes were crucial in driving declines in the demand for private transportation and changes in travel behavior [5]. Next section provides a detailed literature review on the topic.

2. Literature Review

Regarding earlier study on the increase in fuel prices, the majority of the studies focused on the connections between fuel price hike and mode shifting. Table 1 summarizes the recent literature.

A sampling of 120 travelers from two state of Nigeria was used in field survey in 2019 and find that hike in fuel price create scarcity of public transportation and increase fare rate which cause traveler to travel less, and also found that there is significant relationship between fuel hike and patronage of public transit [6].

A representative sample of 40 wards out of 52 wards were taken of Thrissur city and data of 2016 and 2019 were selected and found that for work trips, the distance travelled have positive correlation with the variables CBR, mode and total journey time. This means that no effective change in travel pattern is observed. In case of other trip the variables total journey time and CBR were found to have positive correlation. Also people have a tendency to own their vehicle due to the frequent fluctuation in fuel price [7].

Study was conducted on impact of rising fuel prices on three types of trip patterns of Malaysians who are living in the city areas. Trip patterns are, workplaces trip, leisure trip and personal purposes trip during the weekdays. This was conducted by distributing questionnaires to respondents of private vehicle users in selected city such as Johor Bahru, Kuala Lumpur, Putrajaya, Melaka, Perak, Selangor and Kelantan. Who were using their own vehicles had changed after the rising of fuel prices. The changes showed that many private vehicle users were taking steps to save money on petrol by adjusting their trips. They also may have to change their mode of private transport from car to motorcycle [8].

A representative sample of individuals in the Netherlands who use the car for daily travel were analyzed. Find that the people's travels time will decrease with the fuel price increasing. So the fuel price is negatively correlated with travel time expenditures by car and this

relationship differs between weekdays and weekend. When faced with increasing fuel prices, people seem to prefer reducing travel time expenditure by car for compulsory trips more than for leisure trips [9].

A total of 500 household surveys were distributed throughout social networking sites and apps and a total of 312 were filled to study effect of fuel before and after increase on travel behavior in Jeddah, Saudi Arabia. Find that average household's car commuters, household's car, number household's car trip decreases. Also indicate that no of household non car trip increases and also reveal the willingness of car sharing increases before and after fuel price increase in jan 2018 [10].

The MON (Mobiliteit Onderzoek Netherlands) dataset was used in this study. This data is Dutch National Travel Survey and was collected in 2004. A representative sample of individuals who use the car for traveling was used for revealing the complex interrelationships between people's activity-travel patterns and energy price. The result indicated that the causal structures of people's activity travel behavior are significantly different between days of the week. In general an increase in energy price tend to reduce total travel time and within time constraints activity compete with each other. Result also indicate that the compulsory activity has considerable negative impact on maintenance and leisure activity and maintenance activity has a negative impact on leisure activity due to its hierarchical level [11].

This study was conducted of University Kebangsaan Malaysia (UKM) Bangi, Selangor. In this study, the data collection method done on the respondents is by distributing questionnaire forms total of 150 respondents have answered and returned the questionnaires. This study is to form a model of shifts of transportation modes from private vehicles to public transports (buses) based on the 'fuel price increase' factor to see the change in vehicle preference showed that the rate of fuel price hike influenced at least 88% of private vehicle users to shift to public transports if the fuel price reached RM2.75. The shift of preference from private to public transports with the types of vehicles and the rate of price increase as variables [12].

Table 1. Literature Review

Ref	Author	Title	Finding
[6]	Ajayi, Ogundele, Adebayo, Aworemi and Babalola	Petrol Price Hike and the Travel Behavior of Commuters in Osun State	that hike in fuel price create scarcity of public transportation and increase fare rate which cause traveler to travel less, and also found that there is significant relationship between fuel hike and patronage of public transit.
[7]	Rohini P and Carol Varghese	Impact of fuel price on activity pattern of Thrissur city	that no effective change in travel pattern is observed. In case of other trips the variables total journey time and CBR were found to have positive correlation.

			Also people have a tendency to own their vehicle due to the frequent fluctuation in fuel price
[8]	MM Rohani and N Pahazri	Survey on how fluctuating petrol prices are affecting Malaysian large city dwellers in changing their trip patterns	Many private vehicle users were taking steps to save money on petrol by adjusting their trips. They also may have to change their mode of private transport from car to motorcycle
[9]	Dujuan Yang, Harry Timmermans	Analysis of influence of fuel price on individual activity-travel time expenditure	Find that the people's travels time will decrease with the fuel price increasing. When faced with increasing fuel prices, people seem to prefer reducing travel time expenditure by car for compulsory trips more than for leisure trips

[10]	Mohammed Aljoufie	Analyzing the Effect of Fuel Prices Increase on Travel Behavior	average household's car commuters, household's car, number household's car trip decreases. Also indicate that no of household non car trip increases and also reveal the willingness of car sharing increases before and after fuel price increase in jan 2018
Ref	**Author**	**Title**	**Finding**
[11]	Dujuan Yanga , Harry Timmermans	Effects of Energy Price Fluctuation on Car-Based Individual Activity-travel Behavior	An increase in energy price tend to reduce total travel time and within time constraints activity compete with each other. Result also indicate that the compulsory activity has considerable negative impact on maintenance and leisure activity and maintenance activity has a negative impact on leisure activity due to its hierarchical

			level
[12]	Mohd Azizul Ladina, b*, Mahanon Muhammada, Hamza Imhimmed Mohamed Irtemaa, Hussin A. M. Yahiaa, Amiruddin Ismaila, Riza Atiq Abdullah O.K. Rahmata	A Study of Fuel Price Increase and Its Influence on Selection of Mode of Transports	that the rate of fuel price hike influenced at least 88% of private vehicle users to shift to public transports if the fuel price reached RM2.75. The shift of preference from private to public transports with the types of vehicles and the rate of price increase as variables.

3. DISCUSSION

According to the literature review (table 1), the increase in fuel prices leads to a shortage of public transportation, raises fares, and encourages people to travel less. It was also discovered that there is a strong correlation between the growth in fuel prices and the usage of public transportation. People who were driving their own cars changed once gas prices rose, indicating that they were trying to cut costs by altering their routes. They may have also had to switch from driving a car to riding a motorcycle. Also discover that household car ownership, household car use, household car trip reductions are accompanied by growth in household non-car travel and a rising propensity to employ car sharing.

Additionally, mention how negatively the required chores affect maintenance and leisure time. The study also has certain limitations. As a result, the model's accuracy is constrained by the absence of larger samples. If we could have managed collecting larger samples, more independent variables could be accommodated and the reliability of the model can be improved. It was also recommended that the government should provide palliative measures by investing in the provision of mass public transit and subsidizing such services as an alternative to unsustainable subsidization of petroleum products

4. CONCLUSION

This paper presents a review on the current available literature on travel behaviour and price variation. Further study can be done in these areas, according to the literature evaluation conducted here. The research's objectives for next execution level should be focused to examine the relationship between fuel price fluctuations and the demand for passenger transportation in developing countries, to compute the percentage change in mode shift, to identify the likely causes of the same, and to investigate the potential effects of fuel price increases. Additionally, research may be conducted to examine resident travel patterns and the respondent's socioeconomic characteristics, with consideration of several socioeconomic characteristics.

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