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Transactions Involving Electric Vehicles for Green Technology

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ABSTRACT: This study focuses on using consumer motivation to encourage the adoption of cleaner technologies. Consumers are varied since they may be driven by internal or external reasons. Though information provision methods may be helpful in encouraging some consumers to purchase electric vehicles. Also, financial incentive schemes such as discounts or penalties may be more persuasive to extrinsically driven customers. This article offers a sophisticated theory of environmental innovation adoption in which information-provision methods are complemented with economic incentives. The different studies have been done to find out the policies for encouraging customers to reduce the harmful impacts of transportation system on environment. The projection of electric cars sales by 2030 is examined. Finally, the different reasons fueling development of electric cars are explored in depth. The results of this study would be of particular relevance to legislators who seek to push consumers toward greener technologies.

KEYWORDS: Consumers, Environment, Electric Car, OEMs, Vehicles.

I. INTRODUCTION

The emergence of climate change problems is mainly the consequence of the application of contemporary procedures made feasible by technological development in the last several decades. However, it is widely anticipated that technological advancements will continue to contribute to addressing the growing burden of environmental sustainability in the future. In this article, the author examines the processes through which individual consumers adopt pro-environmental technology in their homes and businesses. It is not only possible to reduce one's own fuel cost, but it is also possible to reduce one's contribution to environmental pollution by driving fuel-efficient cars. While environmental protection is a common interest, not all agents would want to contribute to it by internalizing the externalities associated with the use of fossil fuels, this is not the case for economic development. In this case, it is possible that government action has a mandate to engage in the deployment of environmentally conscious cars. However, it is difficult to predict which approach will be the most effective. A combination of voluntary agreements with producers, information-providing methods (including the supply of energy labels), tax breaks, and financial and legal tools constitutes the European Union (EU) Commission's "three pillar strategy" at the moment. It is anticipated that the utility of information-provision policies, as well as policies of legal and financial incentives targeted at consumers, would be affected by the way these tactics are integrated [1].

Consumers are given with information on the status of the environment and how to live a more environmentally friendly lifestyle as a result of information provision rules. For consumers to engage in significant pro-environmental behaviour, many elements may be considered to be important: awareness of an issue's existence, information of excellent alternatives, a feeling of responsibility and confidence in one's own ability to make a positive impact in the situation. Consummators, on the other hand, tend to vary significantly in these dimensions, and individuals feel responsible in a variety of ways, as well as having specific motivations in reaction to a changing environment. In reality, consumers may be classified as either being "intrinsically" or "extrinsically" motivated to act in an ecologically friendly way, depending on their motivation. Participating in an activity for the sake of an intrinsic reward is analogous to the situation in which consumers engage out of altruistic motives [2].

There are several faults in the traditional economic formula, which is to apply monetary rewards that are intended to lead to the most optimal resource allocations possible. Financial incentives alone will not change society's view of the problem, and they will also dissuade customers from taking voluntary action in the future (thus violating "democratic" principles). For example, the notion of "crowding out" of intrinsic motivation has been shown to be experimentally accurate, posing a danger of possibly decreasing the desire to cooperate in buyers by "price-tagging" the environment and establishing a commercial partnership. To be sure, regulators must be cognizant of the reality that both intrinsic and extrinsic incentives may be powerful motivators of consumer behavior [3].

A. Environmentally Friendly Automobiles

More than a dozen studies have been carried out to determine the best methods for encouraging customers to minimize the environmental impact of travel. An

investigation on the effect of energy efficiency labelling and discounts on car buying choices in the Netherlands is being conducted, with a particular focus on electric vehicles. They come to the conclusion that the introduction of a tax subsidy has a significant effect on the pricing of Toyota Prius hybrid vehicles. Profits declined as a result of the reduction in the subsidies. According to the experts, the environmental footprint of a contemporary vehicle does not seem to be a priority for consumers; rather, when a car is energy-efficient, it appears to be more of a 'bonus' for them. The findings, on the other hand, do not imply that the tax subsidy serves exclusively as a monetary incentive. For owners of electric cars, symbolic benefits exceed purely monetary cost savings owing to reduced fuel costs, according to the study, with the Prius model having the greatest symbolic values. Researchers are investigating if hybrid automobiles are associated with rebound effects (because they could replace former smaller cars or whether they could boost car ownership). Several studies of Prius customers in Switzerland have found little evidence to support these rebound effects, indicating that the primary motivation for purchasing hybrid cars is not to save money, but rather to acquire abstract qualities. It should be emphasized, however, that reduced fuel costs as a consequence of improved fuel economy are often achieved by more expensive contemporary technology, such as hybrid cars; lower income may therefore serve as a barrier, resulting in pre-selection outcomes [4].

The researchers offer a model of the interplay between individual consumer characteristics (including consumer incentives) and the content of knowledge policy business as stated by the authors, the basic psychological factors are significant and should be taken into account while attempting to induce behavioral changes in consumer behaviour via information strategies. They stress the importance of well-designed information policies (such as eco-labeling) in shaping the public's perception of environmental friendliness and the need of environmental education. As a consequence, the details of the knowledge or incentive programme in issue may be used to identify whether a particular client is motivated by intrinsic or extrinsic factors. Researchers are also looking at the possibility of a fee-bate programme having an impact on consumer incentives to purchase a more energy-efficient vehicle (fee-bate systems imply fees for the purchase of energy-inefficient cars, whereas rebates are paid for the adoption of particularly energy-efficient vehicles). Customers are allowed to alter their vehicle choice in return for cash incentives, according to the authors' investigation [5].

In conventional economic models, person agents are supposed to make ethical decisions in the course of their daily lives. Individually, on the other hand, individuals often operate within the framework of a system of "bounded reason." This is widely recognized, especially in the case of automobile sales, when a two-stage decision process may be distinguished between buyers and sellers. A restricted range of vehicle models to be thoroughly examined is selected using bounded logical components (such as brand loyalty) in the first stage, and unboundedly rational multi-attribute decision making principles are used in the second stage to arrive at a final choice by car purchasers [6].

B. Vehicles Powered by Electricity

Hybrid cars were slowly rising in popularity prior to the COVID-19 sickness outbreak wreaking havoc on the automotive industry and many others. A record number of battery electric and plug-in hybrid vehicles were sold in 2019 for the first period in the industry's history. Regardless of the fact that economic uncertainties and fluctuating consumer tastes have obscured significant progress, it is nevertheless important to assess the demand for electric vehicles at this time. The electric vehicle industry has made tremendous strides, and not only in terms of income. To bring new electric cars to market, original equipment manufacturers (OEMs) have also invested billions of dollars in research and development as well as manufacturing upgrades. Consumers' views have shifted in recent years. Interventions by the government have progressed and retreated. However, COVID-19 completely wiped out global sales and production operations. The situation necessitates the creation of a fresh prediction based on updated facts [7].

Their predictions about how the industry will develop over the next decade are based on an examination of the current status of the EV market across the globe as well as a consideration of the many variables that are encouraging development in different directions. Modern OEMs, traditional OEMs, confined financing corporations, and agreements would all benefit from the substantial increase in the number of electric vehicles (EVs) in the years leading up to 2030, but they would also face major difficulties. Traditional OEMs, in particular, will benefit from the findings of this research since consequently, businesses will have the ability to re-prioritize consumers and tactics in an ever-changing competitive environment. It is essential to recognize and manage risks and opportunities as they occur in order to develop a new market segmentation strategy. Using the discoveries of today as a fuel to propel us forward over the next ten years, we will speed beyond the difficulties presented by the epidemic and towards a future in which electric vehicles (EVs) play a key role.

C. Global Developments and Prognosis

Despite the short-term consequences of COVID-19, the cumulative achievements of the EV industry over the past two years offer reason for optimism: the sector is on a trajectory of sustained development that is expected to continue throughout the 2020s. Electric cars (EVs) accounted for 2.5 percent of total new car sales in 2018, thanks to sales of battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) that exceeded two million units. With a look forward, BEVs will account for 74 percent of overall EV sales in 2019, representing a six-point increase over the previous year. Part of the reason for this rise may be attributed to new, stricter European environmental laws, which have encouraged manufacturers to emphasize the development and sale of zero-emission vehicles. Another factor is the fact that China's BEV

industry is more developed than that of the rest of the globe. In the United States and Europe, BEVs continue to be the most popular electric vehicle technology; but, in China, they have a far lower proportion of the market. Since Deloitte last concentrated on EV sales, there's been considerable regional disparities in the growth rates. Even though electric vehicle sales increased by 15% in 2019 compared to 2018, it was owing to an increase in BEV sales in Europe, China, and other areas, among other considerations. Sales of electric vehicles (BEVs) in the U.S have fallen 2% since 2012. During the first part of 2020, COVID-19 will either limit or stop the growth rate of EV revenue in different geographical locations. It's expected that healing times would differ by region. While assessing COVID-19's possible long-term effect on car sales within next three months, it appears that the path to growth over the next decade is obvious. To get a sense of how this could evolve, we need to examine the regional market trends of the last year [8].

D. Expected Sales by 2030

Deloitte has conducted an analysis of the most current data in order to create an up-to-date forecast of the electric vehicle industry for the next 10 years, keeping a close watch on progress made so far. Our knowledge of battery electric vehicles (BEVs) is well established, and it is projected that by 2030, BEVs will account for 81 percent (25.3 million) of all new electric vehicles sold. Sales of plug-in hybrid vehicles (PHEVs) are projected to reach 5.8 million units by 2030. Following the recovery from COVID-19, sales of internal combustion engine (ICE) vehicles will rise until 2025 (81.7 million), after which they will decrease in market penetration and eventually disappear. In their worldwide EV forecast, they estimate that gross EV sales will increase from 2.5 million in 2020 to 11.2 million in 2025, and then to 31.1 million in 2030, representing a compound annual growth rate of 29 percent over the following ten years. When it comes to new automobile purchases, electric vehicles (EVs) will account for about 32 percent of the worldwide market share. After 2024, it is doubtful that annual vehicle sales would recover to levels seen prior to COVID-19. The pace of recovery, on the other hand, is anticipated to be delayed as a result of a drop in ICE sales; EVs, on the other hand, may continue to have a positive prognosis throughout the COVID-19 recovery cycle and may wind up accounting for a disproportionate amount of demand in the near term; and The Chinese are expected to dominate 49 percent of the worldwide electric vehicle market by 2030, followed by Europe with 27 percent and the United States with 14 percent, according to predictions [9]. Markets would have a substantial difference in the percentage of new automobile sales made by electric vehicles. By 2030, we anticipate China to have a domestic market share of about 48 percent, almost double the proportion held by the United States (27 percent), and Europe to have a market share of 42 percent. Affluent nations (like the British And the French, as well as the Netherlands and Germany), like those in Western and Northern Europe (such as Scandinavia), anticipate their economies to expand at a faster rate than those in Eastern and Southern Europe [10].

II. DISCUSSION

Although 486 registered electric car businesses in China have received $18 billion in funding since 2011, their aggregate production capabilities is unsustainable - even if all realistic sales predictions are taken into account. Increased rivalry, the failure of some entrants, and a rise in the number of collaborations and joint ventures amongst Chinese manufacturers as well as Western equipment manufacturers (OEMs) are anticipated outcomes (OEMs). Several well-established OEMs are participating in start-ups far outside China in order to benefit from the expertise they already possess. Although the danger of new entrants as well as start-ups has decreased somewhat, incumbent OEMs really haven't consistently responded to, and planned for, the rise of electric cars. There is a possibility that the competitive landscape may rearrange itself as a consequence of certain manufacturers' desire to adapt quickly to the realm of electric cars and trade in existing approaches for innovation and creativity.

A. Marketing via Segmentation

Considerable effort has been put forward by the whole automotive industry in order to persuade people to acquire an electric vehicle (EV) or, more importantly, how they may do so, how they can encourage customers to own their own electric vehicle (EV). The most apparent choices are to keep current customers satisfied throughout the ICE-to-EV transition or to convert new customers to an EV brand or product line. For one (or all) of these objectives, a refreshed customer segmentation strategy that involves engaging consumers based on their behaviour and wants may be a useful exercise. Customers' tastes and habits vary widely among countries, as do aspects of the automotive industry, the retail sector, the readiness for EV adoption, and the attitudes of consumers, the segmentation concepts illustrated below can be applied to a wide range of international markets. Where they are unable to do so, the fundamental premise remains true: updating your customer segmentation approach will promote EV revenue while simultaneously increasing overall demand development.

B. Factors Influencing Economic Growth

Despite the effect of the COVID-19 epidemic on the market, the long-term prognosis for electric vehicles is favorable. There are four elements that will contribute to the substantial increase in anticipated BEV and PHEV sales by 2030. These are: consumer attitude, legislation and regulation, OEM strategy, and the involvement of corporate entities. Both of these variables saw significant changes in trajectory over the intervening year, prior to the outbreak of COVID-19, and have subsequently been impacted even more by the disease's emergence.

C. The Shifting Sentiment of Consumers

Consumer demand will drive the development of electric cars, however for the time being, there are many reasons why customers have not converted from internal

combustion engines to comparable electric vehicles. The fact is that, as adoption obstacles are being removed, electric vehicles are becoming a more realistic and feasible choice. Between 2018 and 2020, there was a major shift in consumer attitudes about electric vehicles. With the exception of China (+ two percentage points), where EV subsidies have been reduced, concerns about the cost/price premium have decreased in all nations save China. Buyers in Germany and France are less likely to bring up the subject of driving range, even though those two countries have seen a rise in the importance of the issue. Consumers are increasingly concerned about the absence of charging infrastructure as a consequence, suggesting that people are starting to view electric vehicles as a realistic option and are evaluating the advantages and disadvantages of owning one. It is expected that some roadblocks will be completely removed over the course of the next several years. The driving range of electric cars has already achieved parity with that of internal combustion engines; the price has already reached parity when incentives in various markets and the total cost of ownership are taken into account; and the number of models available is increasing. As EV sales increase and consumers see more of them on the road or ride in EVs owned by family or friends, we anticipate that personal impressions will outweigh problems in the near future. This should be bolstered by the anticipated inflow of commercial electric vehicles (such as vans, lorries, and trucks), as well as the expansion of mass-transit options (such as electric buses). Market confidence may be affected by the measures taken by countries as part of their COVID-19 recovery efforts, according to the World Bank. The German government has set aside $2.8 billion for electric vehicle charging infrastructure as part of a $146 billion economic stimulus plan, and it has also announced new rules mandating all gasoline stations to include an EV charging outlet. A significant shift in a world where the two most significant barriers for consumers are a lack of available driving space and a scarcity of charging stations is significant. A similar amount of money has been invested by China, which announced an additional $378 million in charging facilities as part of a COVID-19 recovery plan earlier this year. Policy and Legislation: As shown by Norway's achievements, fluctuating sales in the Netherlands, and the changing fortunes of the Chinese EV industry, government action continues to have a major influence in influencing EV pricing. Although it seems that states that make the transition to electric vehicles would benefit economically, the positive environmental impact has made broad adoption of electric vehicles a crucial step toward achieving climate-change goals such as those stated throughout the 2015 Paris Agreement.

D. Role of Corporations in the Economy

Corporates are becoming more essential in helping with the transition to electric vehicles, taking use of the three reasons mentioned above in doing so. New vehicle sales to businesses make for a significant percentage of total vehicle sales. DeLoitte previously predicted that corporate sales of new cars in Western Europe will represent 63 percent of total purchases by 2021, according to the firm. Purpose has come to the forefront of the business agenda in the past year, with an increasing number of companies attempting to differentiate themselves by acting as a force for social change in their respective communities. Due to the fact that travel is a major source of pollution reduction for businesses, a growing number of companies are investigating how they might make the transition to electric vehicles (EVs) easier. It is time to rethink traditional corporate transportation systems: The benefits of increasing mobility possibilities for employees are recognized by businesses not just in terms of carbon reduction, but also in terms of cost effectiveness and improved employee satisfaction. Tax incentives for corporate cars put the onus firmly on the shoulders of businesses to lead the way in the transition to electric vehicles. Corporate investment in fleets has slowed considerably as a result of COVID-19, as companies cut down on costs and prioritize other investments. Before a full shift to electric vehicles can take place, market confidence must be restored and finances made accessible once again. As a result, businesses must understand how fundamental changes in the way and place work is done may have an effect on the structure of their agility initiatives.

III. CONCLUSION

It is possible to see assistance for information supply methods as a kind of justification for monetary environmental laws. A very "democratic" approach to environmental conservation is to provide consumers with facts about ecological issues while also providing suggestions for how to alleviate the crisis. In this way, consumers are given the opportunity to make their own decisions before being constrained by legislation. A second justification for intelligence policy comes from an awareness of the wide range of environmental motivations that exist among individuals. In contrast to financial resources, information supply should not have the potential to drown out the underlying pro-environmental motivation that is being promoted. Market expectations for environmental policies are shown to be very variable, as confirmed by the descriptive study, which is further validated by both correlation analysis and multivariate regression analysis. When one of the policies was supported, those who supported the other were often less supportive of the first. Indeed, the two policies were not seen to be compatible, but they both appealed to a distinct subset of questionnaire respondents in a different way. Multivariate regressions also showed that customer expectations for certain policies were associated with specific consumer attributes, as shown by the results of the study. It is often believed that certain parts of society would support policy initiatives while other segments will oppose them. It is left to future researchers to investigate whether or not people are aware of environmental issues they are confronted with now. It will be helpful to study why customers who have a better knowledge of environmental issues react properly, as well as how they perceive the effectiveness of programmes aimed at increasing consumer awareness of environmental problems. Furthermore, we

would want to know more about the role of consumer variability in the dissemination process, as well as factual data on the adoption of environmentally friendly cars in the marketplace.

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