

Challenging the Market: The Future of Hybrid Gasoline-Electric Vehicles in Nueva Ecija

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Received: 22 Oct 2023; Received in revised form: 30 Nov 2023; Accepted: 08 Dec 2023; Available online: 14 Dec 2023

Abstract— This descriptive research investigated the future of Hybrid Gasoline-Electric vehicles in the province of Nueva Ecija through awareness and buying motivations for the product. The research identified the level of perception of the prospective car buyers and their respective buying considerations in getting Hybrid Gasoline-Electric vehicles. The study employs a mixed-methods approach, including a survey and internet searches on several studies of Hybrid vehicles and several online platforms. The data revealed that there is no significant disparity between knowledgeable buyers and those who are oblivious to Hybrid Gasoline-Electric automobiles. The study also found that when purchasing a Hybrid Gasoline-Electric vehicle, there are important factors to consider regarding the product itself. However, these considerations are not adequately emphasized due to a lack of reliable information from the manufacturer. As a result, many customers rely on information provided by sales representatives and the Internet. Moreover, the study revealed some factors and advantages of the product that receive less emphasis in marketing but can significantly influence the purchasing decisions of purchasers in this particular vehicle class. The study recommends that automakers and their sales representatives focus on the most crucial quality aspects and allocate resources towards customer education and communication. This would help establish trust in the product and foster brand loyalty among customers in Nueva Ecija.

Keywords— *Buying Considerations, Critical Product Attributes, Gasoline-Electric Vehicles, Hybrid, Market*

I. INTRODUCTION

The constant rise in global temperature may lead to a drastic and catastrophic climate change. This may harm the global environment and all the living things on earth.

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This event calls for global action of every nation, which led the way to the creation of the Paris Agreement last December 12, 2015, in Paris, France. The agreement is

to "legally binding international treaty on climate change" and is adopted by 196 nations including the Philippines.

According to UNFCCC, the Paris Agreement's overarching goal is to hold "the increase in the average global temperature to a well below 2°C above per industrial levels and pursue efforts "to limit the temperature increase to 1.5°C above per industrial level.

Global warming is the slow increase in the average temperature of the earth's atmosphere because an increased amount of energy(heat) striking the earth from the sun is being trapped by the earth's atmosphere and not radiated out

into space.

Transportation is an essential activity that provides access to services and activities such as education, employment, shopping and social events. However, the transportation sector is one of the main contributors to carbon emissions.

According to the recent publication of Statista Research Department, in 2021 the greenhouse gas emissions coming from the transport sector in the Philippines will amount to 31.54 million tons of Carbon Dioxide equivalent. This reflects a 12 percent increase from the previous year's total emissions.

Several car manufacturers have introduced a sustainable mode of transportation through the use of hybrid vehicles.

Hybrid cars entered the Philippine automotive market way back in 2000 when Toyota first introduced the iconic Toyota Prius.

According to the report of CNN Philippines published last June 2019, Toyota only sold 300 units of this model. These low sales are attributed to the high cost of the units which amounts to P2.3 million pesos, which is enough to purchase two passenger non-hybrid cars.

However, the company's optimism was not cut in changing its goal of expanding the hybrid car market in the Philippines. Toyota continues to introduce several new hybrid models such as the Corolla, Cross, Camry, and RAV4 hybrid variants.

However, according to the latest publication of Moneymax dated August 2022, still the Philippine market is too conservative in choosing hybrid vehicles and this segment was not popular in the market even though they were introduced a decade past.

Some of the reasons for not getting a hybrid according to their study are:

1. More expensive upfront
2. Poor in handling
3. High voltage battery.

This factor contributes to the struggles of the Hybrid cars in surviving the market.

With this, the researchers decided to study the possibility of the hybrid cars in surviving the current market, particularly in the province of Nueva Ecija by identifying several factors of reasonable opportunities and challenges it may encounter. The researchers also believe that the timing of the study is right since heavy inflation is hitting the Philippine economy and significant rise in the price of fuel in the country due to the effect of the current

war by Russia and Ukraine.

II. METHODOLOGY

This research utilized a descriptive and quantitative approach. A survey questionnaire will be administered to a sample of residents in Nueva Ecija to collect data on their buying considerations and perceptions towards Hybrid Gasoline-Electric vehicles.

Sampling Procedure. The instrument of data collection is in the form of survey questionnaires that were distributed using Google Forms. The distribution was personally done by the researcher to ensure the confidentiality of the information gathered and to assist the participants if they have queries about the questionnaire.

The sampling technique to be used in this study is a simple random technique. The researcher chose this technique to have a general overview of the population.

Respondent. The researcher aims to reach the customers within Nueva Ecija to grasp the actual insights regarding their consideration if choosing Hybrid Gasoline-Electric vehicles.

A total of **70 respondents** answered the questionnaire sent by the researchers through Google Forms.

III. RESULTS AND DISCUSSION

1. Level of Awareness of the Respondent about the Hybrid Gasoline-Electric Vehicle

Table 1. Awareness of Hybrid Gasoline-Electric Vehicles

Level	Frequency	Percent
Fully Aware	11	15.71
Aware	25	35.71
Somehow Aware	19	27.14
No Idea	15	21.43
Total	70	100.00

The data shows the percentage of respondents with their corresponding level of awareness about the Hybrid Gasoline-Electric vehicles. The data shows that 36% or 25 respondents are aware of this type of vehicle model while 21% or 15 respondents rate themselves as unaware of the product. Cambridge Dictionary defines product awareness as knowledge about the particular products a company may offer, especially compared to those offered by the competitor. Based on the blog of Wargrove, A. (2020), brand awareness (which includes product awareness) is the first step to driving performance-marketing goals. It makes

people more aware of the brand or the product, especially when targeting relevant high-quality audiences and increases your chance of generating conversions and dominating your market.

To grasp the current situation, the researcher also looks at the source of information of the respondents about the Hybrid Gasoline-Electric vehicles.

2. Source of Information

Table 2. Source of Information

Source of Information	Frequency	Rank
Word-of-Mouth	16	3
Dealer Personnel	25	1
Manufacturer or Dealership Ads	11	5
Broadcast Media, TV & Radio	13	4
Social Media & Online Advertisement	18	2

As shown in the table, most of the information about the Hybrid Gasoline-Electric vehicle is coming from the Dealer Personnel, primarily the sales frontlines and is ranked 1. It is followed by social media and Online advertisement while the lowest source of information is the advertisement initiated by the manufacturer or dealership. According to the Journal of Live Agent (2022), the importance of the sales front line as the initial source of product information is great because the sales front line is often the first and main contact between the customer and the brand. It has a huge impact on customer's decisions as well as satisfaction with the contact brand.

Furthermore, according to Hausman, A. (2022), that the automotive industry must up its game regarding digital marketing. Based on his journal, the fact that the most prospective vehicle car buyer nowadays spends more time searching the internet, searching inventory and even arranging a test drive argues strongly that the automotive business must recognize digital marketing. Manufacturers-initiated advertisement greatly helps to reach a larger market as compared to the front lines. It also provides the reliability of the product whenever it reaches their prospective buyer.

3. Level of Respondents' Perception when Choosing Hybrid Gasoline Electric Vehicle

Table 3. Respondents' Perception of Choosing Hybrid Gasoline-Electric Vehicle

QUESTION	4f	w	3f	w	2f	w	1f	w	Total f	Total w	WM	Verbal Interpretation
Product QDR	34	136	30	90	6	12	0	0	70	238	3.40	Highly Considered
Price	45	180	18	54	7	14	0	0	70	248	3.54	Significant Highly Considered
Marketing & Promotion	25	100	32	96	12	24	1	1	70	221	3.16	Highly Considered
Unit Availability	48	192	16	48	5	10	1	1	70	251	3.59	Significant Highly Considered
After Sales Services	55	220	12	36	3	6	0	0	70	262	3.74	Significant Highly Considered
Legal Considerations	36	144	25	75	7	14	2	2	70	235	3.36	Highly Considered
GRAND WEIGHTED MEAN											3.46	Highly Considered

Data shows the respondent's perception when choosing a Hybrid Gasoline-Electric vehicle. Data shows that After-Sales Services with a 3.74 rating, followed by Unit Availability and Price with 3.59 and 3.54 ratings respectively are the highest aspects when considering this vehicle segment.

Several studies have said that the after-sales cost of owning a hybrid gasoline-electric vehicle is somehow low since it doesn't need to burn more fuel every time. According to Automart. ph (2021), even though a Hybrid vehicle is expensive to buy, it offers huge savings for those who find themselves in a stop-and-go traffic situation. Keeping regular car inspections & checking minor details on the engine, routinely changing basic fluids, observing regular maintenance, and using appropriate viscosity of oil, may prolong vehicle deterioration when having a hybrid vehicle.

Hybrid Gasoline-Electric vehicles are most likely expensive to buy compared to conventional ones. This is due to the complex nature of the powertrain of Hybrid vehicles, aside from the fact that it is equipped with several advanced technology features. Nowadays, several brands offer low-cost Hybrid models in the Philippines. According to Deri Quito, J. (2023, April 11), one of the most affordable Hybrid Gasoline-Electric vehicles in the Philippine market is the Toyota Corolla Altis which is valued from P 1,054,000 to P 1,610,00. In another journal published by Honda, Hybrid vehicles hold their value once they leave the dealership. One study by ACS, published that supply chain weaknesses were brought about by the Covid-19 pandemic, especially in the industries that relied on electronics, as the flow of raw material slowed or sometimes stopped. The batteries in

Hybrid vehicles require rare metals that depending on the supplies, can have volatile and unpredictable prices. This is one of the reasons that hampers the mass production of Hybrid vehicles by the manufacturers which in turn limits the availability of the unit.

4. Level of Respondents’ Tangible Consideration when Choosing Hybrid Gasoline-Electric Vehicle

Table 4. Respondents’ Tangible Consideration on Choosing Hybrid Gasoline Electric-Vehicle

QUESTION	4f	w	3f	w	2f	w	1f	w	Total f	Total w	WM	Verbal Interpretation
Vehicle Designs and Aesthetics	47	188	18	84	5	36	2	2	70	250	3.57	Significant Highly Considered
Modern Features	56	224	11	33	2	4	1	1	70	262	3.74	Significant Highly Considered
Usability	42	168	22	66	5	10	1	1	70	245	3.50	Significant Highly Considered
GRAND WEIGHTED MEAN											3.60	Significantly High Influence

Data shows the respondents' level of consideration when choosing a Hybrid Gasoline-Electric vehicle. Among the three listed tangible features, the highest factor is Modern Features with a 3.74 rating followed by Vehicle Designs and Aesthetics with a 3.57 rating. Meanwhile, the Usability factor got the lowest rating among the three, with a rating of 3.5. This means that this factor is less considered by the respondent when choosing a Hybrid Gasoline-electric vehicle.

Filipino car buyers nowadays are fascinated with the modern technology of the vehicle. According to Mayol, P.A. (2020), the latest technology in vehicles and other in-car apps improves the convenience and safety of passengers. Traditionally, the usability factor means that the vehicle must be useful to the driver with a higher driving task, efficient such that presents minimal distractions, and at ease of use must be compatible with the competing demands on the driver.

Table 6. Respondents’ After Sales Consideration on Choosing Hybrid Gasoline Electric-Vehicle

QUESTION	4f	w	3f	w	2f	w	1f	w	Total f	Total w	WM	Verbal Interpretation
Dealer Facility	36	144	28	84	5	10	1	1	70	239	3.41	Highly Considered
Parts Availability	47	188	18	54	4	2	0	0	69	244	3.54	Significant Highly Considered
Service Maintenance Cost	50	200	17	51	3	6	0	0	70	257	3.67	Significant Highly Considered
GRAND WEIGHTED MEAN											3.54	Significant Highly Considered

Data shows the data of Respondent's consideration when choosing a Hybrid Gasoline-Electric vehicle based on After Sales Services. The highest factor is Service Maintenance with a 3.67 rating followed by Parts Availability with a 3.54 rating.

5. Level of Respondents’ Intangible Consideration when Choosing Hybrid Gasoline-Electric Vehicle

Table 5. Respondents’ Intangible Consideration on Choosing Hybrid Gasoline Electric-Vehicle

QUESTION	4f	w	3f	w	2f	w	1f	w	Total f	Total w	WM	Verbal Interpretation
Fuel Efficiency	50	200	16	48	3	6	1	1	70	255	3.64	Significant Highly Considered
Environment Friendly	55	220	12	36	2	4	1	1	70	261	3.73	Significant Highly Considered
Value for Money	43	172	22	66	3	6	2	2	70	246	3.51	Significant Highly Considered
Performance	55	220	13	39	2	4	0	0	70	263	3.76	Significant Highly Considered
GRAND WEIGHTED MEAN											3.66	Significant Highly Considered

Intangibles are beneficial elements that provide a personal connection to the product, helping a consumer feel more confident happy and satisfied.

Based on the data shown in Table 8 the level of consideration of vehicle buyers in terms of intangible benefits, vehicle performance got the highest rating of 3.76 followed by Environment Friendly with a 3.73 rating. When the Hybrid Gasoline-Electric vehicle was introduced, several studies highlighted that one of the hesitations of car buyers is that they believe that the performance of this kind of vehicle segment is low. According to the blog of Firestone entitled *The Pros and Cons of Hybrid Vehicles*, hybrid vehicles may have less power compared to standard vehicles because they are manufactured for lower CO2 emissions and improved fuel economy but are rarely designed for race car-like speed acceleration. However, in the report of Reuters (2014, May 20), Toyota Motor Corporation has developed computer chips for its Gasoline-Electric vehicle that could boost vehicle performance by 10% and allow the automaker to install the hybrid system on its vehicles.

6. Level of Respondents' After-Sales Consideration when Choosing Hybrid Gasoline-Electric Vehicle

Most of the common issues of the Hybrid Gasoline-electric vehicles are its parts and components, particularly the life span of the Hybrid battery. The recent blog of King Toyota (2020) entitled *How Long Do Toyota Hybrid Batteries Last?* says that most manufacturers claim

that the hybrid battery (on average) will last from 80,000 miles up to 100,000 miles. This means that you can run your Hybrid Gasoline-electric vehicle for up to 10 years and up the life span for its battery. Aside from that, Toyota went further by offering a warranty that covers the Hybrid battery for eight years or 100,000 miles whichever comes first. In terms of Service Maintenance, a Hybrid Gasoline-electric vehicle is equipped with an internal combustion engine and an electric motor. What is the common Service maintenance

procedure on a typical vehicle is the same on the Hybrid vehicles. According to some journals, the only additional cost in the After Sales Service is the cost you replacing a Hybrid battery.

7. Level of Perception on the Hybrid Vehicle based on Challenges that Buyers May Encounter when Choosing this Vehicle Segment

Table 7. Respondents' Perception of the Hybrid Vehicle

QUESTION	4f	w	3f	w	2f	w	1f	w	Total f	Total w	WM	Verbal Interpretation
Dealer Readiness & Preparedness	33	132	26	78	8	16	3	3	70	229	3.27	Highly Considered
Cost of Ownership	29	116	32	96	7	14	2	2	70	228	3.26	Highly Considered
Community Acceptance	27	108	34	102	6	12	3	3	70	225	3.21	Highly Considered
Vehicle Life Span	28	112	29	87	11	22	2	2	70	223	3.19	Highly Considered
Investments	29	116	29	87	11	22	1	1	70	226	3.23	Highly Considered
GRAND WEIGHTED MEAN											3.23	Highly Considered

The table presents the data on the respondents' level of perception about the challenges they might encounter when choosing a Hybrid Gasoline-electric model.

The factor that got the highest rating is the Dealerships' readiness and preparedness to sell Hybrid Gasoline-electric vehicles with a 3.27 rating.

According to Toyota Motor Philippines, with the goals of working towards sustainable mobility, TMP continues to prepare their dealership in terms of marketing and selling Hybrid vehicles. Some of the programs they are working on a continual training on both sales front lines and after-sales services such as technicians in terms of several aspects of Hybrid vehicles including its technicalities. The company firmly believes that it will help boost prospective hybrid vehicle owners so that their hard-earned money will not go into ways when they decide to get one of this new vehicle segment.

IV. CONCLUSIONS AND RECOMMENDATIONS

1. The primary sources of information about the Hybrid Gasoline-Electric vehicle in Nueva Ecija are dealer frontlines and social media, indicating a need for manufacturer-initiated advertisements to enhance product reliability and buyer confidence.

2. Prospective buyers in Nueva Ecija have higher expectations for after-sales services and unit availability, highlighting a potential challenge for dealerships in meeting these demands when selling Hybrid Gasoline-Electric

vehicle models.

3. The current market consideration in Nueva Ecija emphasizes that Hybrid Gasoline-Electric vehicles are well-equipped in terms of tangible, intangible, and after-sales factors, making them well-suited for the market.

4. To succeed in the Nueva Ecija market, dealers and manufacturers should be prepared (Subia, Mangiduyos, & Turgano, 2020) and pay close attention to factors such as legal considerations, vehicle usability, and dealer facility, as these factors play a crucial role in influencing buyers' decisions regarding Hybrid vehicles.

5. Manufacturer-initiated advertising efforts should focus on providing detailed information about Hybrid vehicles to enhance their reliability and increase buyer confidence.

6. Dealerships and manufacturers should prioritize improving after-sales services and ensuring the availability of Hybrid Gasoline-Electric vehicle units to meet the higher expectations of prospective buyers in Nueva Ecija.

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