Predicting the Total Sales of Shell Gasoline Station using Multiple Regression

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Abstract

Gasoline prices are always an issue for its high prices. It is common for people to grab saving opportunities like discounts thus they start to give good reviews or even become loyal to that business. In this study, the main objective is to predict the total sales using multiple regression. Moreover, the attributes that will identify the total sales are the gas transaction frequency and discount values. The gas transaction frequency is the times the customer used their discount privilege.

To predict if gas transaction frequency and discounts affect the total sales. There is an available dataset from a gasoline station which enabled the researchers to use in this study. The first problem is to find the significant attributes and correlation is the statistical tool used. With that, it supported the variable gas transaction frequency and discounts as the independent variables. In continuation, the multiple regression model was able to produce with the given independent and dependent variables. The model shows a high score of good fit in predicting the total sales using the gas transaction frequency and discounts. The actual value and predicted value have both far and close values, that still achieved the second objective. Lastly, visualizations are used to represent the effect of marketing strategies on the customers' loyalty and total sales. The results have shown that April is a month of the station has a downfall in total sales which are also reflected in their discounts and gas transaction frequency.

Overall, the results have shown that there is an effect between gas transaction frequency and discounts on total sales. From this, we can have another literature basis of how discounts as a marketing strategy affect the total sales of a business.

Introduction

(Shell Philippines, 2022) It is a worldwide power and petroleum products corporation with almost ninety-three thousand employees and workers in ninety nations. It has its own company in the Philippines, which comprises firms involved in oil and gas drilling, producing, oil refineries, transportation, and product sales. It also offers a wide array of goods and services, including gasoline, lubricants, select retailers, and car services. Shell introduced V – Power Nitro Plus, a better and relatively high version of its V – powerline fuels, in June 2012. V-Power Nitro+ Gasoline (replacing Super Premium), V-Power Nitro+ Racing (replacing V-Power), and V-Power Nitro+ Diesel are the three new gasoline products in the new product range (replacing V-Power Diesel). Their new fuel line is developed to better clean an engine's interior parts, allowing it to run more efficiently. The new gas line is meant to properly maintain an engine's interior parts, allowing it to function more effectively.

(Shell Philippines, 2022) It began its operations in 1914 and has since grown to become one of the Philippines' largest investors, hiring over three thousand people around the nation. Pilipinas Shell Petroleum Corporation refines, blends, transfers, and sells a wide range of high-quality fuels, lubricants, bitumen, and other oil-based specialty products. It operates refineries with a design power of over one hundred ten thousand barrels per day (BPD) and over nine hundred sixty It has risen to become a major in the oil and gas business, providing energy to the country's already economy.

(Pilipinas Shell Petroleum Corporation, 2021) The "Site of the Future," recently launched by (PSPC) in Silang, Cavite is established becoming a worldwide fundamental basis for transport stations targeted at improving customer experiences, allowing more methods of transport, and reducing carbon footprint thru the advancement. It is first in the Philippines and was one of the first in the world. It is a downstream refining and marketing corporation based in the Philippines. It also focuses on petroleum refining into a variety of refined fuels for residential, commercial, and transportation usage.

According to Shell Pilipinas Foundation, Inc. 2022. Pilipinas Shell Foundation, Inc., the company's social department, develops projects to meet the needs of Filipinos throughout the nation. The programs give a comprehensive strategy in bringing Filipinos ahead, from supplying electricity to far-flung areas to working toward agricultural production. As the current energy change occurs, the plan is to improve the business's position as a leading energy corporation by delivering oil and gas as well as low-carbon energy. The approach to business is based on protection and security responsibility.

(Library of Congress, 2022) As the world's principal fuel sources, oil and gas are key sectors in the energy industry and have a significant impact on the world economy. Oil and gas production and distribution processes are very sophisticated, capital-intensive, and need snipping technology. Due to the obvious production process or stream part of the industry, gas has historically been related to oils. Oil and gas have been seen as a problem for much of the industry's history, and it

has been discharged in huge amounts in several areas around the world, — including the United States. Oil and gas have taken on a more major position in the world's energy supply. As more than just a result of shale oil and gas growth in the U.S., as stated above, and its lower emissions of greenhouse gases when consumed as compared to oil and coal. Upstream, midstream, and downstream are the three main segments of the oil and gas industry. While each of these areas has several independent companies, major companies in oil and gas are often considered integrated, meaning their businesses consist of a mix of upstream, midstream, and downstream activities. The amount of information available depends on whether the company is private, public, or state-owned.

According to the Library of Congress (2022). Exploration and production are the primary concerns of upstream enterprises. Local oil firms, such as OPEC, or consolidated multinational oil businesses manage the majority of crude oil production. High gasoline prices, as well as high quantities, help upstream industries. Rig number and capital investment are two more criteria to consider. Oil and gas delivery and storage are handled by midstream enterprises. Many individual transportation providers make up this section. Midstream firms rely on oil and gas quantities, as well as pricing as they correlate to volume: if upstream businesses cease production, midstream companies are no longer needed for transportation. Oil and gas processing and marketing are handled by downstream corporations. In comparison to the upstream segment, there is less competitive concentration. Downstream firms gain from profitability that allows them to sell their refined goods for a higher price than just the cost of procuring crude resources. The number and quality of refineries are two more indicators to consider.

Depletion is the only factor that affects oil prices and supply risks have always been a factor, but this time around it has added to a more severe price spike. The crisis in Iraq might also lead to supply disruption of 5000 barrels a day in the short term. However, markets are now responding negatively to these possibilities and may ease off slightly. (Žaglinskis & Lazareva, 2018)

According to Elving, R. (2022). Even before Russia invaded Ukraine, gasoline prices in the United States were approaching record highs in February. The price of gasoline is now greater than it has ever been. Heating oil and gas, which are used by millions of people in the United States and Europe to heat their houses, have also risen in price. The supply of fuel and the price at the pump, on the other hand, is the ultimate contemporary wartime captives in America. That is why gas stations advertising exorbitant pricing this summer and autumn will have a greater impact on the November midterm elections than all of the campaign billboards combined.

The researchers aim to explore the effects of discounts and gas transaction frequency on Shell's total sales under the gasoline and fuels category.

The research problems of the study are:

1. What are the significant attributes that contribute to predicting the total sales?
2. What prediction model can be used to predict the total sales?
3. What data visualization tools can be used to identify the marketing strategies' effect on the customers' loyalty and total sales?

The objectives of the study aim:

1. To determine the significant attributes that contribute to predicting the total sales.
2. To create a multiple regression model that predicts the total sales.
3. To determine how effective, the marketing strategies such as gas transaction frequency and discount are to the customers' loyalty and total sales.

This academic study will cover the discounts and sales reports provided from a certain Shell gasoline site station. This will let the exploration of the customers around the station, Quezon City, be examined on their gas transaction frequency.

This study is only limited to the area of the gasoline site where the data comes from. This may or may not represent the preferences of the urban people on acquiring and allocating budget to transportation needs.

The academic paper aimed to target the positive effects of discounts in contributing to Shell's total sales. The output assessments from this research will serve as a manual for a better statistical approach to using this customer loyalty strategy. The findings will give a beneficial report on the following:

Shell Executives and Site Owners. The study will help the executives and owners to understand how provided discounts improve the customer's loyalty to the company.

Gasoline Station Site Managers. This research will help the managers to attract more customers without sacrificing too many discount giveaways.

Gas and Oil Customers. This will inform the customers of the benefits they can get by registering for an upgrade subscription to Shell's offers.

Proponents. This research will let the researchers discover the relationship of discounts and gas transaction frequency to the total sales of a Shell gasoline station.

Future Researchers. This study contains new sets of data that will contribute to the exploration of future researchers for further research about the factors affecting Gas and Oil Sales.

Literature Review

Oil-based products are mainly used by people in the automobile industry. Gas and oil have become a necessity for the transportation of people, goods, and other materials. Gasoline is sold by Shell station (The Royal Dutch / Shell Group), one of the world's largest integrated oil and gas companies. Nearly every gas station is required to have several features such as gallons of gasoline filling up the tank. The company makes efforts to ensure that it maintains high sales volume for its products by following a well-thought-out marketing strategy.

According to an article from the Washington Post regarding the real cause of gas price spike, exploration and production (E&P), i.e. oil and gas exploration and drilling, is a capital intensive business involving large initial investments for the acquisition of lease acreage, the drilling of wells, the seismic work to locate pore spaces filled with hydrocarbons, the actual drilling of wells, production to bring produced fluids to the surface, and pipeline facilities necessary to transport hydrocarbons to refinery markets. Because E&P is capital intensive, small price changes can make a huge impact on profitable projects.

Based on the findings of the publication from Fitch Solutions Industry Insight Reports, Indonesia is categorized as a mature oil and gas producer. A significant challenge for the country is to overcome its insular oil and gas exploration record, which suggests that the country lags behind its regional peers in terms of upstream FDI attraction. Despite strong gas resources, the stagnant pace of oil production has been identified by analysts as an emerging concern against its peers. This challenge is intensified by internal demand growth, estimated at nearly 20%, against a backdrop of an increase in local consumption rates.

China has a plan to have cleaner fuels by 2045: it aims to achieve the transition from coal to natural gas and cleaner-burning fuels in its fossil fuel consumption mix. The country has the largest consumption of fossil fuels with total consumption of petroleum, natural gas, and coal consumption estimated at 2.9mn b/d, 3.8bn m^3/d (1.35 tcf), and 7.5bn t/y (21 million tpy), respectively, in 2017. (BMI Industry Insight Reports, 2018)

The country analysis of the gasoline market in the presence of a vertically integrated dominant firm includes cross-country analysis. The main focus is on price transmission in the presence of a vertically integrated dominant firm and pipeline legislation. The study also covers the research method and findings which proved that the Hungarian gasoline market is unfair due to the vertically integrated dominant firm. (Farkas & Yontcheva, 2019)

There is an increasing body of literature on identifying the role of information in retail gasoline pricing. The first wave of research studies (Guenther and Shaffer, Su, Williams, and Wu), which were based on a theoretical model developed by Sraer and Jaccard in 2001, focused on how information affects the pricing behavior in competitive (U.S.) markets. Second-generation research examining retail gasoline price recognition was stimulated by the two econometric studies by Sills and Patton (2006) and by Sills, Barnett, and Patton (2005).

According to the study by Kristine and Avramova (2009), “fuel prices at petrol stations in touristic cities and their influence on fuel consumption”, with an estimated price elasticity of

demand of less than one, the prices at petrol stations in touristic cities are expected to be higher than common.

For Phoenix Petroleum Philippines together with other oil companies such as Shell Pilipinas, the importance of delivering social responsibility was highlighted among other business strategies. It is through their CSR approach and partnership with LTFRB that brought about a new concept of providing PUV drivers a one peso discount every time they purchase P1 fuel from Phoenix Petroleum stations from January 1 to February 14, 2018. (Contify Energy News, 2018) The Department of Energy (DOE) has called on power distributors to give a P0.40 per kilowatt-hour (kWh) discount on electricity rates to oil and gas companies as the government is set to introduce the tax reform law. (MENA Report, 2018)

Shell has unveiled a new campaign based on discounting petrol on Valentine's Day. This case study looks at when, why, and how promotional price offers are used in the marketing mix and what makes them work. It will also look at the predominant theories surrounding the elements underpinning promotional pricing. (Manila Bulletin, 2020)

Diesel fuel and unleaded gasoline prices in the Philippines surged to new record highs Wednesday as oil firms raised pump prices due to the fall in the value of the peso against the dollar. Rising global oil prices on top of a weakening Philippine peso pushed up local fuel prices which now stand at Php63.64 per liter for diesel and Php73.96 per liter for gasoline, industry officials said. We can see that Brent Crude oil prices are affected greatly by the political climate in Eastern Europe, and particularly in Russia itself. As the American relationship with Russia continues to

deteriorate, concerns over a trade war between the two countries have created market uncertainty. If tensions between the two countries continue to rise, there is a possibility that Brent Crude prices could spike to nearly $240 per barrel by early next year, according to an analysis from JPMorgan Chase & Co. (Hilotin, 2022)

The Philippines and the International Monetary Fund (IMF) began negotiations on a three year standby loan in early 1980. The negotiations are the first of their kind involving the IMF and a national government in Asia since 1973. The loan, equivalent to US$307 million, will enable the Philippines to continue financing its rapidly growing external debt while providing funds for economic recovery, rehabilitation, and growth. (Llanto, 2021)

According to the Philippines Oil & Gas Report (2017), in Q2 2017, Shell Pilipinas has shown a double-up in its net income. The company reported a net income of Php1.6 billion in Q2 2017, a 600 percent increase when compared to the same period last year. The record earnings are primarily attributable to a boost in oil prices and strong consumption in wholesale and retail outlets. However, the average sales price per barrel declined by 3.4 percent on the higher excise tax regime implemented in January 2017 offset by an equivalent amount increase of Php11 per barrel value added tax on fuel products effective July 1, 2016.

According to the Philippines Oil & Gas Reports (2020), Shell Philippines Exploration BV (Shell), an affiliate of Royal Dutch Shell plc. gave assurance that it would honor its contract with the Department of Energy (DOE) to explore and develop the Malampaya area until 2024 despite contract expiration in 2020. Manila Bulletin said it has received confirmation from the office of

Senator Cynthia Villar, chairperson of the Senate Committee on Energy, that Shell will not be abandoning its operations in the Philippine Exclusive Economic Zone (EEZ).

The literature review has given us a better understanding of the effects that technology, changes in supply and demand, and location plays on the sale of gasoline for companies. Specifically, we have seen that none of these factors seem to affect prices when a target point has been reached within a certain amount of time. It seems that marketing plays a large part in sales of products as companies offer sales on vehicles when there is more competition coming in and also offer discounts to get their name out in the public so they are recognized.

Methodology

A descriptive research design is a type of approach that aims to recognize different factors that describe the topic of the study. These include - characteristics, frequencies, trends, correlation, and categories. The researchers can understand and have supporting information regarding the paper's primary objective. (Bachelor Print, 2020)

> According to the given definition of https://www.questionpro.com/blog/descriptiveresearch/, Descriptive research is a method of market research used to identify the size, structure, distribution, and other characteristics of a particular market segment. In other words, descriptive research aims to describe the nature of a particular demographic segment without covering "why" a phenomenon occurs.

Descriptive research is used in the marketing industry to examine the characteristics of a target audience. Descriptive research can measure one or more characteristics, such as demographics, personality traits, lifestyles, and social-economic status. These characteristics are typically gathered through structured surveys and questionnaires. The data collected from descriptive research is then used to identify key market segments, which will then help with your targeted marketing campaign.

Quantitative research highlights gathering numerical data, analyzing it, generalizing it across groups of people, or explaining a particular phenomenon. Quantitative methods emphasize objective information. Quantitative studies produce accurate estimates about how large a part a particular factor plays in causing something. (LeTourneau University, 2022)

The descriptive research method is used as a survey to determine the attributes of a given research problem. This method uses qualitative methods in their work and is conducted through both quantitative and qualitative scrutiny. This will guide the researcher to develop various conclusions that offer different solutions to the problem at hand. The descriptive analysis looks for two main things: segregation and discrimination between factors involved in an ongoing study and inequality in these two factors, which shows that one is more desirable than the other (Hair et al., 2006).

This is achieved by using statistical evidence by way of calculating proportion variables and deriving variance from them. Hair et al. (2006) further mention that one of the most common applications of descriptive analysis is determining the correlation between two variables. The data collected can present or show what statistics or data have been derived using quantitative methods. Hence, the resulting information helps give you detailed information on how your research project should be carried out, what kind of questions to ask, and any predictions or inferences you should make while collecting data. (Bachelor Print, 2020)

Using a quantitative research approach, The Level of Cybergogy Readiness Among Technical Students used the survey technique as descriptive research. The author's goal in this study is to discover the characteristics of technological students' educational experiences and student demographic classifications. The current study used a descriptive research design to characterize the features of the population or phenomena under consideration. Ponudurai, Raasini & Putra, Andika & Mohaffyza, Mimi & Tee, Tze & Bc, Kok & Azid, Nurulwahida. (2021)

The study, Quantitative Research Methods: A Synopsis Approach, applied quantitative research. The study is concerned with quantifying and evaluating factors to obtain conclusions. It entails using statistical tools to analyze numerical data to answer questions such as who, how much, what, where, when, how many, and how. It also refers to accumulating quantitative data to understand a problem better. Quantitative methods are further divided into survey research, correlational research, experimental research, and causal-comparative research, according to the study. Apuke, Oberiri. (2017)

The study entitled Quantitative Research Tools analyzes the methodological approach utilized in quantitative research. The author methodically explains primary and secondary data and provides quantitative research methodologies. The current organization also explains how to decide whether or not to use and adapt a given research instrument. Ali, Ameer. (2021)

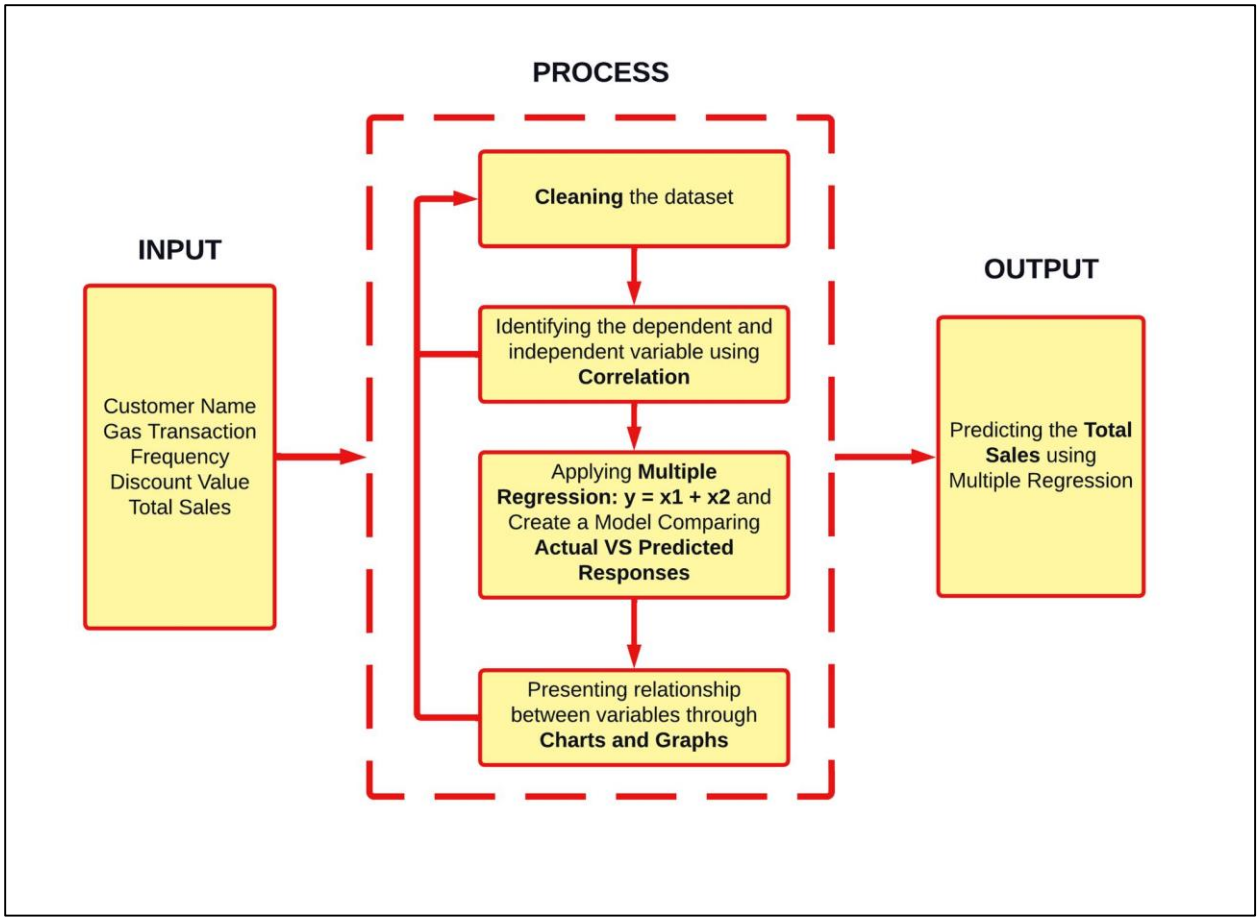

Figure 1. Input-Process-Output Diagram

In continuance to the supporting ideas of descriptive research designs involving quantitative study, one can correlate these two to equate numerical interpretations to definite analytical presentations. The help of these findings can guide the researchers. They will have an idea of what solutions to give out to the beneficiaries of the study. In connection with the researchers' topic, the study of Predicting the Total Sales of Shell Gasoline Station using Multiple Regression is a descriptive type of research that falls under the quantitative category. As the researchers have the list of registered customers to discount benefits, sales data, gas transaction frequency, and discount values, they can scrutinize the relationships among the variables, which exhibits the characteristics of a descriptive and quantitative research design.

Before proceeding to the main statistical measure intended, multiple regression, the researchers need to cleanse the data as a preparation.

Concerning the study's first objective, the determination of significant attributes in predicting the total sales is through correlation. The assigning process will be done through correlation. The researchers will identify if there is any relationship between the variables. These sets include gas transactions to total sales, discounts to total sales, and gas transactions to discounts. Each set's direction and strength results will help the researchers identify the vital components that will predict the total sales.

We are proceeding to objective number two, creating a multiple regression model. As we are now equipped with independent and dependent variables, we can now satisfy the formula of multiple regression. That is the sum of independent variables equivalent to the dependent variable.

As multiple regression is applied to the available variables, the numerical results will define patterns and trends that will help the researchers interpret the impact magnitude of gas transaction frequencies and discount values on the company's sales.

In continuation, the researchers will create train and test datasets to compare the actual and predicted values of the total sales. As the model is now completed, the process of predicting the results will follow.

For the third and last objective of the study, the researchers are to find out how effective is the marketing strategy in predicting the total sales. Notably, we are mentioning the use of discounts and gas transaction frequency. The customers are needed in this interpretation. They will be included in visualizations and reports that show the effectiveness of the marketing method used in predicting total sales. Their identity is censored, thus data encoding. Their fixed numerical identification will now help us determine the frequency of their negotiation with the company without laying out data privacy.

If there is no relationship found and no model created, the researcher will have another try by cleansing and transforming the dataset. In any event that no relationship is indeed built, the researchers will rely upon the existing studies and journals proving that the available variables affect the total sales. Mainly, these are the gas transactions and the discount values.

The output reports will benefit Shell Executives and Site Owners, Gasoline Station Site Managers, Gas and Oil Customers, Proponents, and Future Researchers.

Results and Discussion

In relation to specific problem number 1, what are the significant attributes that contribute to predicting the total sales? The researchers used correlation to identify the variables to be used in the study. A correlation is a statistical measure that recognizes the relationship between the variables.

The main point is to know the intensity of the independent variables on the effect on the dependent variable. Beforehand the statistical computation directing to the objective of the study, the researchers have reviewed the correlation between total sales to discount values and total sales to gas transaction frequency. The researchers need to identify the relationship between these variables to answer the first objective which is presented in the overall scatter plot below.

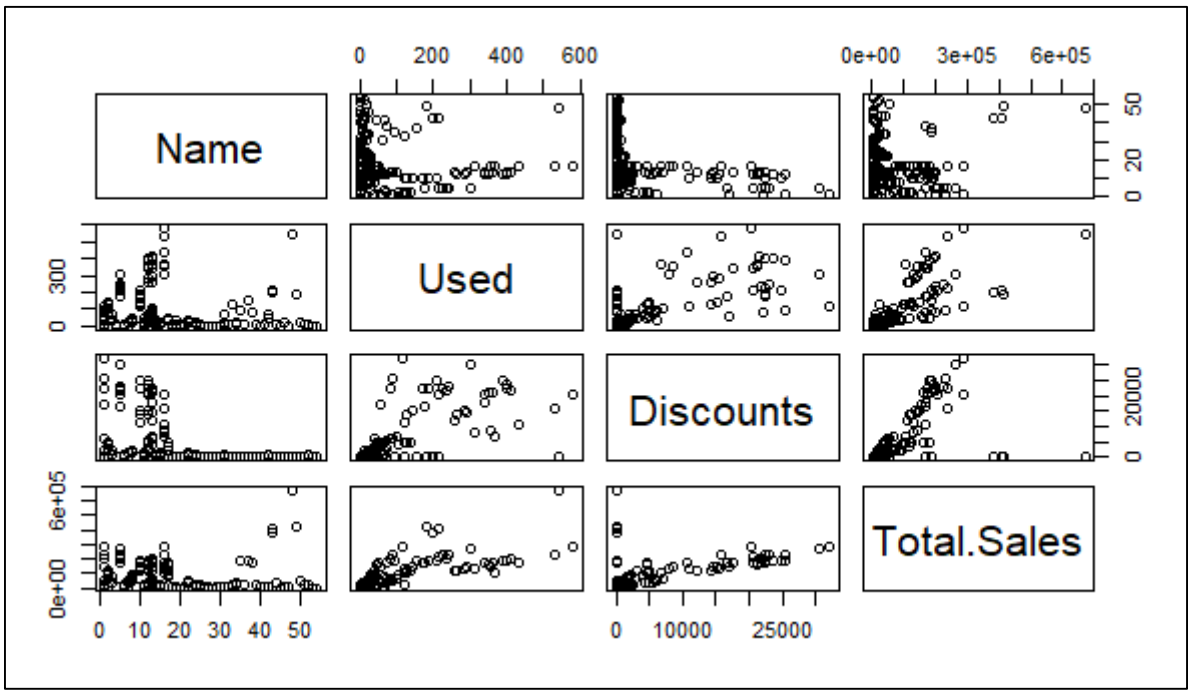

Figure 1. Overall Scatterplot Among the Customers, Used Transactions, Discounts, and the Total Sales.

Figure 1 shows the overall scatterplot among the customers, used transactions, discounts, and total sales. One can see that the direction and strength between gas transaction frequency (Used) and Total Sales, discount value (Discounts) and Total Sales, gas transaction frequency (Used), and discount values (Discounts) are all giving a positive direction and strength. Put together, there is a positive correlation between these variables. To fully understand, the following diagram will show the correlation coefficient values.

```
> cc_SalesDiscount
[1] 0.61
> cc_SalesUsed
[1] 0.77
> cc_UsedDiscount
[1] 0.73
```

Figure 2. Correlation coefficients between Discounts, Used Transactions, and Total Sales.

```
> cc_AllVAr
             Month  Name  Used Discounts Total.Sales
Month         1.00  0.32 -0.02     -0.09        0.08
Name          0.32  1.00 -0.13     -0.38       -0.04
Used         -0.02 -0.13  1.00      0.73        0.77
Discounts    -0.09 -0.38  0.73      1.00        0.61
Total.Sales   0.08 -0.04  0.77      0.61        1.00
```

Figure 3. Overall Correlation coefficient table of the dataset.

Figure 2 and 3 shows the correlation coefficient values between the variables. It concludes that the gas transaction frequency and discounts are the significant attributes contributing to the total sales. With their values of more than 0.50, they proved to be the needed variables in proceeding with the study.

With these values, we can conclude that there is a positive correlation between the three pairs of variables; used and total sales (1) giving us a correlation coefficient of 0.77, and discounts and total sales (2) giving us a correlation coefficient of 0.61 and used and discounts (3) giving us a correlation coefficient of 0.73. This indicates that the frequency and discounts positively correlate to total sales. In basic interpretation, as the frequency of gas transactions and discounts rises, the total sales also increase. This goes the same between the gas transaction frequency and the discount, as the first affects the latter.

In relation to the specific problem number 2, what prediction model can be used to predict the total sales. The researchers need to establish a multiple regression model to predict the total sales. As it is confirmed and declared that gas transaction frequency and discounts are the independent variables and the total sales are the dependent variables, the researchers will create a model using these two variables.

```
> lmodelShell <- lm(shellData$Total.Sales ~ shellData$Discounts + shellData$Used, data=
train)
> lmodelShell

Call:
lm(formula = shellData$Total.Sales ~ shellData$Discounts + shellData$Used,
    data = train)

Coefficients:
        (Intercept)  shellData$Discounts       shellData$Used
           17932.04                 1.28                 551.04
```

Figure 4. Creation of Linear Model

```
> summary(lmodelShell)

Call:
lm(formula = shellData$Total.Sales ~ shellData$Discounts + shellData$Used,
    data = train)

Residuals:
    Min      1Q  Median      3Q     Max
-121607  -18352  -14810    8641  358575

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)        1.793e+04  5.023e+03    3.57 0.000451 ***
shellData$Discounts 1.280e+00  8.367e-01    1.53 0.127621
shellData$Used      5.510e+02  5.226e+01   10.54  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 59010 on 192 degrees of freedom
Multiple R-squared:  0.6035,    Adjusted R-squared:  0.5993
F-statistic: 146.1 on 2 and 192 DF,  p-value: < 2.2e-16
```

Figure 5. Summary of the Linear Model

Figure 5 shows the Linear Model Summary. It presents a multiple R-squared of 0.6035 which translates to a good fit of the variables for the study model.

```
> head(av_pv)
  act_value pred_value
1 199412.10   26211.87
2 152361.90   46706.71
3 229383.63   93136.65
4 288975.13   71565.75
5  98998.39  100155.31
6 105850.24  122959.19
> tail(av_pv)
    act_value pred_value
190    212.50  118773.89
191    820.00   27299.87
192 170619.45   20136.24
193   1125.46   24626.84
194 408768.12   18493.95
195 675175.19   18493.95
```

Figure 6. Head and tail results of the Actual Value VS the Predicted Value

Figure 6 which is a result of actual value and predicted value shows a variety of certainty. It is inevitable to have a far-off prediction. However, as one may observe, there are still many observations showing a slight difference between the actual and predicted values.

14	150463.21	100335.67
15	130576.10	57844.59
16	13752.19	36022.62
17	10746.26	18539.69
18	4090.57	19101.17
19	25372.88	20291.25
20	38966.94	20381.10
21	17987.79	19731.50
22	174335.97	19751.15
23	49712.45	224090.08
24	193691.21	176039.40
25	168024.67	181904.34

Figure 7. Actual Values VS Predicted Values

Figure 7 is a proof of values that there are actual and predicted values that are close enough to one another. An example would be the 21st row with an actual value of 17987.79 and a predicted value of 19731.50.

In relation to specific problem number 3, what data visualization tools can be used to identify the marketing strategies' effect on the customers' loyalty and total sales. The researchers have used scatterplots, bar graphs, line graph, and a summarized table of values.

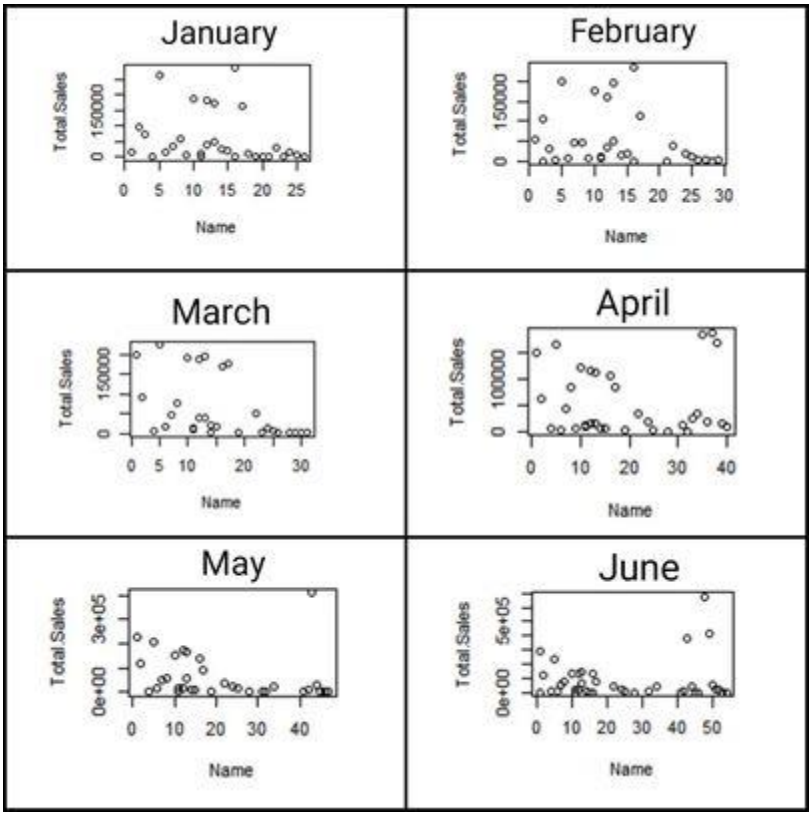

Figure 8. Scatterplot between Customers and Total Sales for the Months of January to June of 2021

Figure 8 have shown the scatterplot between customers and total sales every month, from January to June. However, there is no extreme reflection of sales from each customer, and it has shown continued participation in gasoline transactions. Looking into the first three months, January to March, customers under the group of 5-10 and 15-20 have an excellent leading to the company's total sales. From May to June, customers under the cluster of anonymized numbers 40-50 contribute to the highest sales of the said month.

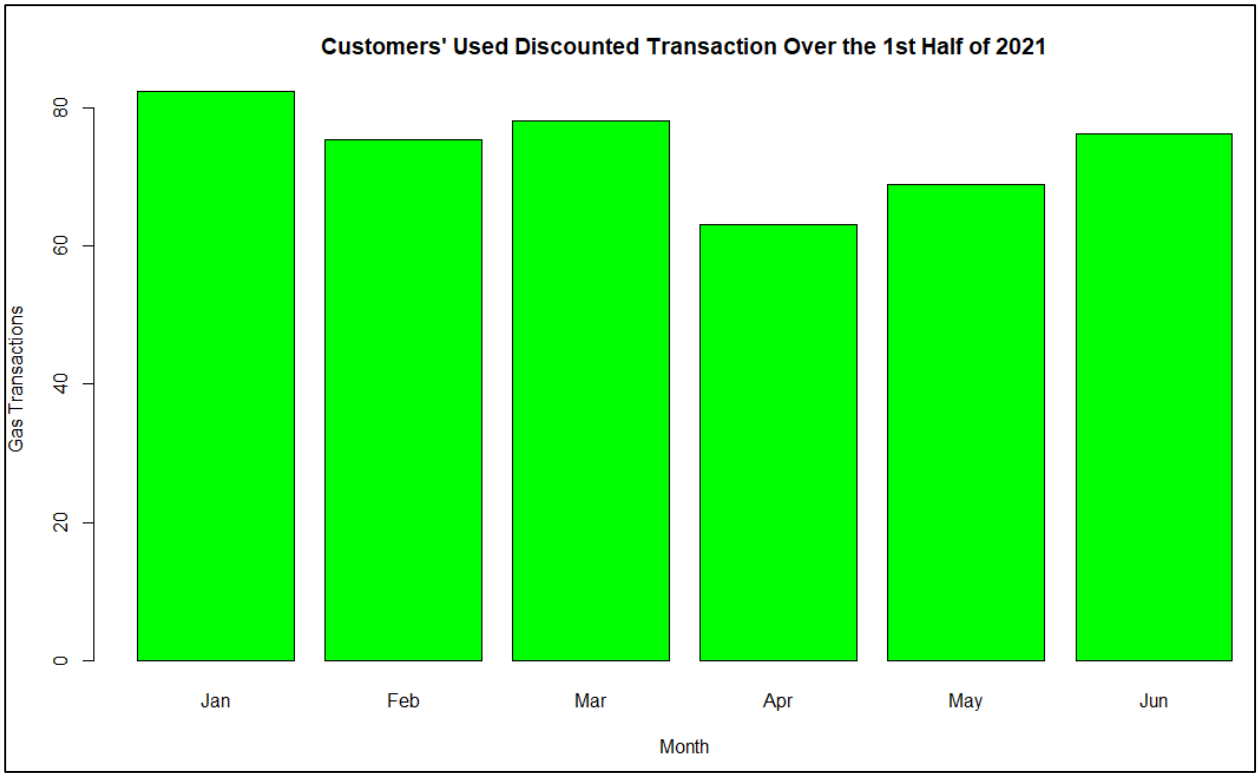

Figure 9. Bar Graph of the Gas Transactions for the 1st Half of 2021

Figure 9 is a bar graph showing the gas transaction frequency of the customers for the months of January to June. The numbers slacked the lowest in April only gaining more than 60 gas transactions.

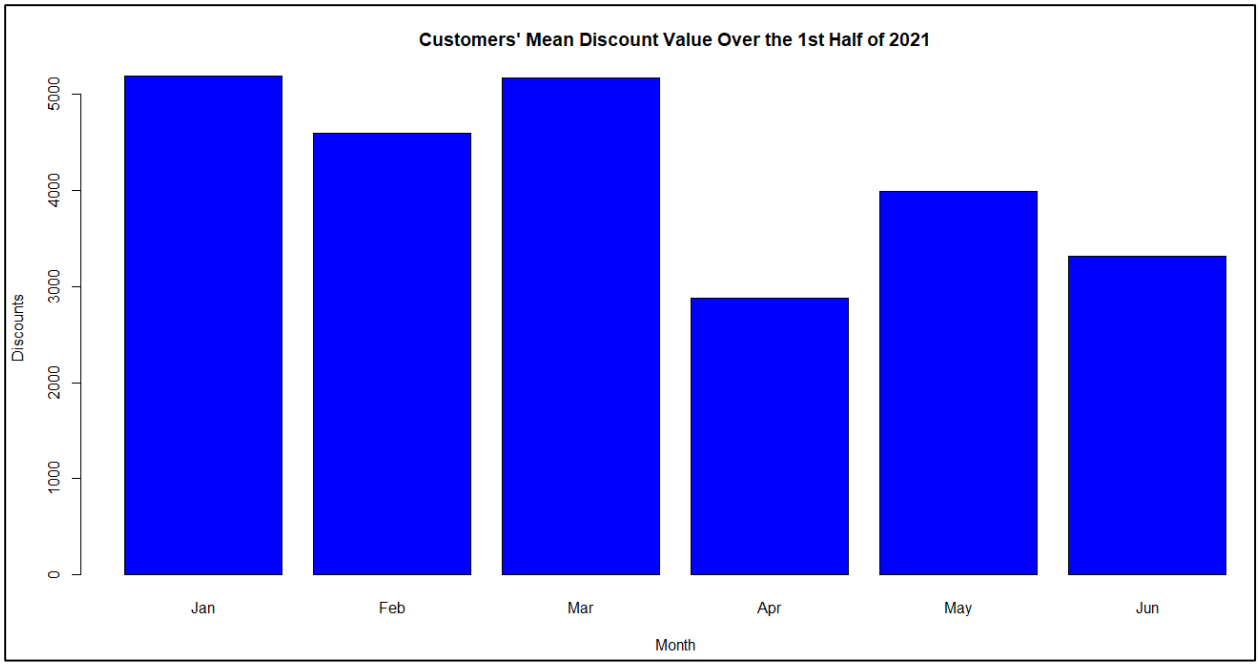

Figure 10. Bar Graph of the Discounts Given for the 1st Half of 2021

Figure 10 shows that they have given the lowest value of discounts for the month of April which parallels the lowest gas transaction frequency presented above.

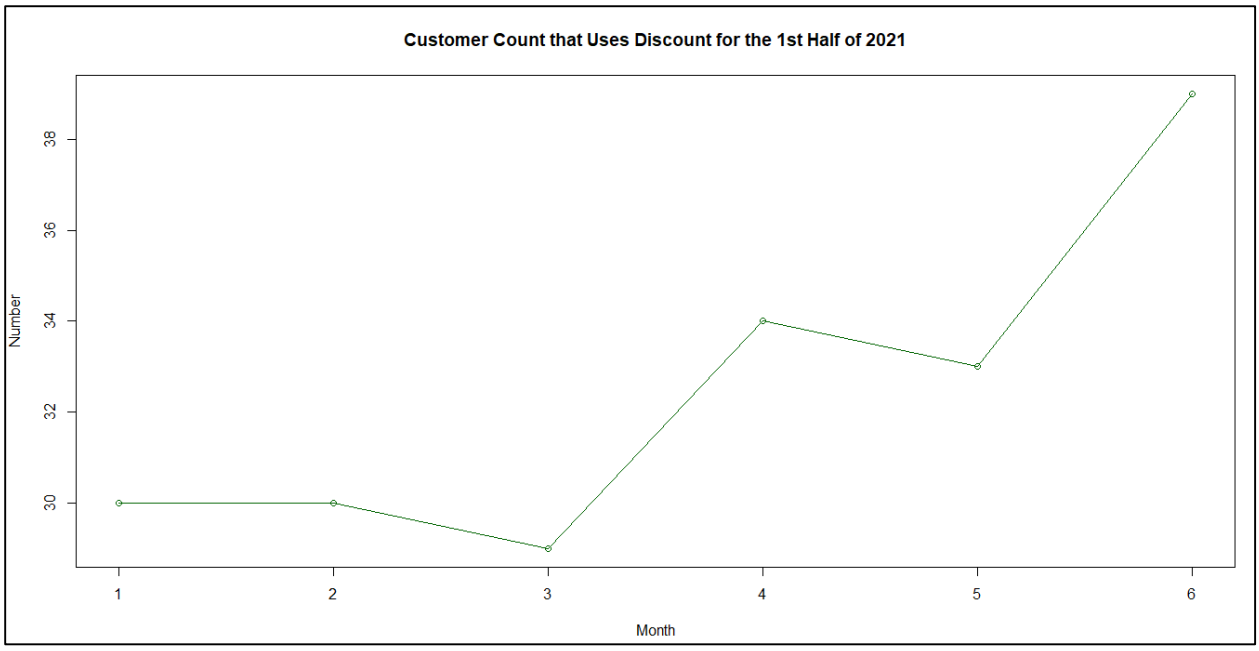

Figure 11. Line Graph of the Customer Count for the 1st Half of 2021

Figure 11 shows the line graph of the customer count for the months of January to June. It shows a relative increasing value but had its collapse during the months of March and April. Nevertheless, for the 6th month of the year, it reached its highest number for the 1st half of the year.

Table 1 will show the minimum and maximum total sales from January to June. This shows that April is indeed the month of total sales downfall for it gives a high minimum and maximum values. The high amount for the bottom of the total sales means no public vehicles can use this discount opportunity. As for the maximum, it shows that no superficial companies are having a transaction with the gasoline station.

Min and Max of 6-Month Total Sales		
Month	Min	Max
January	149.3	284831.5
February	201.45	234441
March	215.31	225398.1
April	440.3	189458.3
May	186.4	408768.1
June	141.51	675175.2

Table 1. Min and Max of 6-Month Total Sales of 2021

Summary

The researchers aim to predict the total sales using multiple regression. It was descriptive-quantitative research that magnifies the effects of gas transaction frequency and discount values affecting the total sales prediction. The independent variables are the gas transaction frequency and the discount values. The dependent variable is the total sales. Other components such as the months and customers helped to identify the effects of the independent variables or quoted as marketing strategies to the loyalty of the customers as well.

The study relied on the available dataset from the gasoline station containing components such as the customer names, gas transaction frequency, discounts, and total sales ranging from the months of January to June. The customer names are anonymized with numerical values.

Conclusions

For the first objective, to determine the significant attributes that contribute to predicting the total sales, a correlation was used. The correlation coefficients between total sales and discounts, total sales and gas transaction frequency, and discounts and gas transaction frequency, have shown a positive correlation. With that, it concludes that discounts and gas transactions are the independent variables to use in predicting the total sales.

For the second objective, to create a multiple regression model that predicts the total sales, the identified independent and dependent variables are used. It has shown high multiple r-squared values of 0.6035 which interprets the variables as a good fit for the study. The actual and predicted values have a widespread as there are some far and close from each other. It only shows a part to improve in the study for far predictions are inevitable for small-scale study.

For the third objective, to determine how effective, the marketing strategies such as gas transaction frequency and discount are to the customers' loyalty and total sales, graphs, and diagrams such as scatterplots, bar graphs, line graphs, and tables of values are used. It has shown that April is the month wherein total sales are at their lowest. The mean discounts, mean gas transaction frequency, and customer count all show a favorable presentation that April is the slowest month of the Total Sales. An additional interpretation is that in the month of June, the highest number of customers came to transact with the gasoline station. But then, it does not mirror the high value of gas transaction frequency and discounts. This can be caused by the station's lowering of discount rates and the fact that the economy is starting to boom again as people are gradually allowed to go outside.

In conclusion, the objectives of the researchers are all configured, accepted, and supported with statistical evidence. The significant attributes in predicting total sales are gas transaction frequency and discounts. Second, the model created through multiple regression has shown a high accuracy rate, thus successfully obtaining close results between actual and predicted values. Finally, a set of customers is identified in which they have contributed the most to the total sales. With the significant attributes available, the total sales are consistently achieved. This has shown that the customers have a coherent linkage to total sales as it mainly shows a collective linear data plot presentation.

Recommendations

To further improve the study, there are areas to be highlighted as future researchers continue the study.

1. The addition of other variables such as promo intervention and current news during the time of gas transactions would enhance the understanding of how total sales are formulated.
2. This would be great combined with a qualitative study as categorical data such as day and night duties could provide an additional factor to consider in predicting total sales.
3. Using a longer term for the dataset's timeframe would refine a better set of findings.

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BSIT-BA 2nd year Group 1

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CAREER OBJECTIVE:
To make use of my interpersonal skills to achieve goals of a company that focuses on customer satisfaction and customer experience.

PERSONAL INFORMATION

AGE	:	21
SEX	:	MALE
BIRTH DATE	:	FEBRUARY 11, 2000
BIRTH PLACE	:	MARIKINA CITY
CIVIL STATUS	:	SINGLE
LANGUAGE SPOKEN	:	FILIPINO

EDUCATIONAL BACKGROUND

Tertiary	|	José Rizal University Mandaluyong City Bachelor of Science in Information Technology Major in Business Analytics	2020 – 2021
Senior High School	|	José Rizal University Mandaluyong City Computer Hardware and Software Servicing	2018 – 2020
Junior High School	|	Highway Hills Integrated School Mandaluyong City	2014 – 2018

EVENTS / SEMINARS ATTENDED
Workshop Electronics – Diagram and Circuit Program
June 26, 2019
José Rizal University

Computer Systems Servicing NC II
March 02, 2020
Manila International Skills Academy

SKILLS & INTEREST

- Computer Literate
- Email Communications
- Communications Skills
- Microsoft Office
- Hardware and Software Skills
- People Skills

I hereby declare the above-mentioned information is true and correct to the best of my knowledge.

Kier Vincent Borja

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CAREER OBJECTIVE:
To expose my basic and enhanced skills in the work field or any related to it, to showcase my practical abilities and techniques in leading and collaborating with my future work colleagues and be fertile in the strenuous working environment of the chosen field.

PERSONAL INFORMATION

AGE	:	20
SEX	:	FEMALE
BIRTH DATE	:	AUGUST 3, 2001
BIRTH PLACE	:	SAN JUAN CITY
CIVIL STATUS	:	SINGLE
LANGUAGE SPOKEN	:	FILIPINO

EDUCATIONAL BACKGROUND

Tertiary	|	José Rizal University Mandaluyong City Bachelor of Science in Information Technology Major in Business Analytics	2020 – 2021
Senior High School	|	José Rizal University Mandaluyong City Science, Technology, Engineering and Math	2018 – 2020
Junior High School	|	José Rizal University Mandaluyong City	2014 – 2018 with Honors

EVENTS / SEMINARS ATTENDED

Rizalian Leaders' Congress
July 6, 2019
José Rizal University

Workshop Electronics – Diagram and Circuit Program
June 26, 2019
José Rizal University

Youth Congress 2019
February 17, 2019
Atrium – Executive Building, City Hall Complex, Mandaluyong City

PSST! (Privacy, Safety, Security and Trust Online) National Symposium
December 07, 2018
5th Floor, Henry Sy Sr. Hall, De La Salle University, Manila

SKILLS & INTEREST

MICROSOFT OFFICE

- Microsoft WORD with basic formatting skills in making documents
- Microsoft POWERPOINT for simple and organized presentations

INTERPERSONAL SKILLS

- Leadership skills that possesses different values to be applied during a responsibility
- Communication skills that can process works together with workmates
- Decision-making skills that can be used in technical situations and planning
- Negotiation and listening skills that considers the idea of all and puts it up to the whole thought of decision

I hereby declare the above-mentioned information is true and correct to the best of my knowledge.

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