



## Forecasting Road Traffic Accidents in the Socioeconomic Context

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**Abstract:** Road traffic accidents not only take lives, but they also have a vast impact on the economy of the nation. This study aims to provide the appropriate agencies with statistical models of road traffic accidents and the most prevalent causes of motorcycle accidents. To achieve that, the researchers applied certain statistical procedures such as the Moving Average, Weighted Moving Average, Exponential Weighted Moving Average, Chi Square Test of Multiple Proportions, ARIMA Modelling, and Measures of Forecasting Accuracy. These were conducted through softwares like Microsoft Excel and SAS. The researchers identified the most accurate model to be the 6-month Exponential Weighted Moving Average and used it for forecasting. The forecast showed that by the end of 2021, road accidents would have increased from the end of 2019. However, the researchers are aware that the forecast may be inaccurate as more people are impelled to stay at home with the ongoing pandemic; therefore, road accidents have lessened. Despite the reduced economic impact due to road accidents, the Asian Development Bank estimates that the pandemic will deter the GDP growth of the nation by 10%. Furthermore, with the data available, the researchers identified human error to be the prevalent cause of road traffic accidents. However, no known causation factor “No Accident Factor” comprised 99% of the data, thus the researchers highly recommend the Philippine National Police and Metropolitan Manila Development Authority to thoroughly investigate road traffic accidents to identify their cause in order for engineers and road safety practitioners to resolve them.

**Key Words:** road traffic accidents, accident modeling, road safety, ARIMA, socioeconomic impact

### 1. INTRODUCTION

#### 1.1. Background of the Study

In 2017, road traffic accidents were the fourth leading cause of death in the Philippines. A report by the Philippine Statistics Authority in 2016 showed that there were 582,123 deaths reported in motorcycle accidents. With the recent prevalence of motorcycle taxis, this number is likely to increase in the coming years. A study conducted by Lam et al. (2018), which involved model estimates of road traffic accidents in the Philippines during 2014, showed that the projected number of deaths and injuries was equivalent to a direct medical cost of 1.213 billion pesos. Moreover, the cost in productivity loss due to death and serious injury resulted in ₱24.62B and ₱685M, respectively. Another article by the World Health Organization (WHO) suggests that road crashes cost \$518B annually on a global scale and affect 1-2% of the gross national product of countries. This study also added the importance of awareness towards estimating the volume of road accidents along

with its expenditures in order to create cost-effective measurements to further prevent such disasters and ensure safety.

Accident prediction models help road safety practitioners assess the causes of road accidents; together with engineers, they may help reduce road accidents by devising safety features. Abdulhafedh in 2017 indicated that accident prediction models have helped determine the crash frequency and severity of such crashes. This data has helped transportation agencies, health care facilities, and research institutions to identify the most dangerous roads.

#### 1.2 Research Objectives

In relation to the circumstances of road safety in the Philippines, this research has the following objectives:

- a) To determine the most prevalent causes of motorcycle road accidents in Metro Manila for the year 2019;



- b) To forecast the number of road traffic accidents in Metro Manila for 2020 and 2021; and
- c) To generate a statistical model of road accidents in Metropolitan Manila for the years 2010-2019.

### 1.3 Scope and Limitations

This study covers the road accidents that occurred in Metropolitan Manila for the years 2010-2019 only. This research may not accurately determine certain factors as the data is left for the researchers to interpret and rely on information provided by the Metropolitan Manila Development Authority (MMDA); the data provided by the said agency may not be tampered with by the researchers.

### 1.4 Significance of the Study

As cars increase, so do road traffic accidents. This study would help the LTO, MMDA, and other related agencies to improve road safety features needed in Metropolitan Manila to reduce road accidents. Moreover, proper authorities such as the MMDA and LTO would take action to possibly reduce road accidents in the future. Furthermore, this study can inform the general public to be cautious. All these contribute to lessening road accidents and, in turn, lessen the economic losses of the nation.

## 2. METHODOLOGY

### 2.1 Data Collection Method

The data for this study was acquired from the MMDA via the Freedom of Information website. The data request thread may be accessed through this link: <https://www.foi.gov.ph/requests/aglzfmVmb2ktcGhyHgsSB0NvbnRlbnQiEU1NREEtMjk0NTQ4MTA1MTY2DA>.

### 2.2 Data

The data set received had complete monthly data points from 2010 to 2019 and was categorized as Damage to Property, Fatal, and Non-fatal Injuries. MMDA also provided data containing the causes of motorcycle accidents for 2019 based on police blotter books; however, some accidents have no determined cause of the accident. The determined causes of accidents are classified as human error, mechanical defect, vehicle defect among others (see Appendix A for complete details).

In forecasting the number of accidents for the year 2020 to 2021, the researchers divided the data set from 2010-2019. The analysis data used to build the model is the monthly data from the years 2010-2017, while the data used to test the model for errors is the monthly data from 2018-2019. Ninety-six data points

(80%) are used for the analysis data, while 24 (20%) are used for the test data.

### 2.3 Research Procedure

#### 2.3.1 Chi-Square Test with Multiple Proportions

This study utilized a chi-square test to determine the presence of significant differences in the proportions of the significant causes with respect to the number of accidents. The purpose of chi-square testing is to assess the distribution of responses to the discrete outcome variable from each of the independent comparison groups (LaMorte, 2016). The null hypothesis is where all proportions obtained are equal, whereas the alternative hypothesis indicates that not all proportions are equal.

#### 2.3.2 Moving Average

A moving average is a statistical technique that creates a series of averages in a given data set in order to analyze selected data points; thus, this technique is also suitable for forecasting trends. Salkind in 2007 said that moving averages assume that a future value will equal to an average of past values. In a Simple Moving Average (SMA), the mean is calculated without any weighted data n. The equation for SMA is as follows:

$$SMA(n) : F_t = \frac{A_{t-1} + A_{t-2} + \dots + A_{t-n}}{n}$$

where

- Ft = forecasted value
- At = actual value in period t
- n = number of time periods

In a Weighted Moving Average (WMA), weights are implemented such that more recent data points are given more significance compared to previous data. Weights are freely assigned to the data with the rule that the sum of the weights utilized must equate to 1. WMA has the equation:

$$WMA(n) : F_t = W_{t-1}A_{t-1} + W_{t-2}A_{t-2} + \dots + W_{t-n}A_{t-n}$$

where

- Ft = forecasted value
- Wt = weight assigned to period t
- At = actual value in period t
- n = number of time periods

$$\text{and } \sum_{i=1}^n W_{t-i} = 1$$

Exponential Weighted Moving Average (EWMA) is a variation of WMA used in smoothing a data set by calculating for the exponential mean of the previously measured data. Similar to WMA, it involves placing more weight  $0 \leq w \leq 1$  on more recent data points while giving a forgetting weighting factor



$(1 - w)$  to data points more distant in the past. The formula for obtaining the EWMA is shown below:

$$Z(t) = [w \times X(t)] + [(1 - w) \times Z(t - 1)]$$

where

$Z(t)$  = EWMA at time  $t$

$X(t)$  = actual data point at time  $t$

$w$  = degree of weighting parameter,  $0 \leq w \leq 1$

### 2.3.3 ARIMA

The researchers also conducted autoregressive integrated moving average (ARIMA) in forecasting road accidents since it complemented the creation of a time series model using autocorrelation analysis, taking into consideration temporal observations. The modeling process followed the Box and Jenkins method, which comprises four stages — identification, estimation, diagnostics checking, and forecasting (Avuglah et al., 2014). The identification stage was used to determine stationarity of the model. Differencing the series was conducted if not. The next step was to identify the orders of the autoregressive (AR) and moving average (MA) terms. After such, estimation was performed to determine the least mean squared deviations in order to test if the model is fit so that the forecasting process may be applied.

This study utilized the ARIMA(p,d,q) model where:

$p$  is the number of lag observations included in the model (lag order);

$d$  is the number of times that the raw observations are differenced (degree of differencing);

$q$  is the size of the moving average window (order of moving average).

### 2.3.4 Measures of Forecasting Accuracy

The Mean Squared Errors (MSE) and the Mean Average Percentage Error (MAPE) were conducted to evaluate the models for any errors and accuracy. MSE has the equation:

$$MSE = \sum_{t=1}^T \frac{(Y_t - \hat{Y}_t)^2}{Y_t}$$

where

$Y_t$  = Actual value

$\hat{Y}_t$  = Forecasted value

MAPE has the equation:

$$MAPE = \frac{100}{T} \sum_{t=1}^T \left| \frac{Y_t - \hat{Y}_t}{Y_t} \right|$$

where

$Y_t$  = Actual value

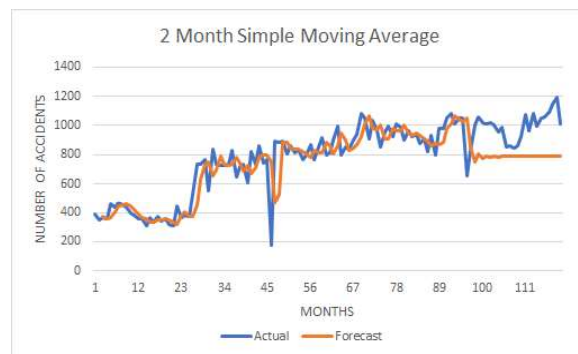
$\hat{Y}_t$  = Forecasted value

## 3. RESULTS AND DISCUSSIONS

### 3.1 Moving Average



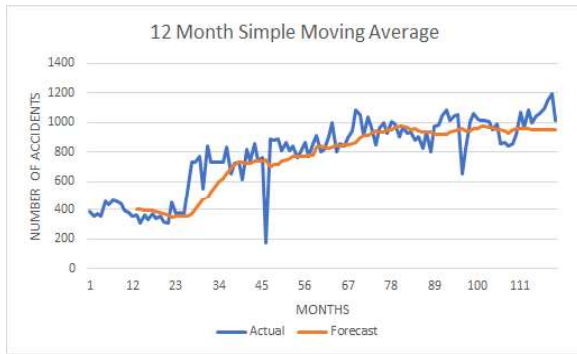
**Figure 3.1.1** 1-Month Simple Moving Average 2010 to 2019



**Figure 3.1.2.** 2-Month Simple Moving Average 2010 to 2019



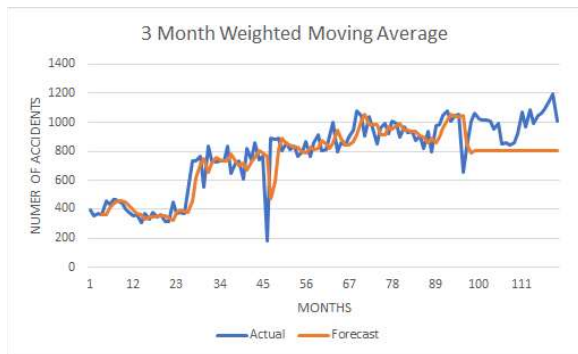
**Figure 3.1.3.** 6-Month Simple Moving Average 2010 to 2019



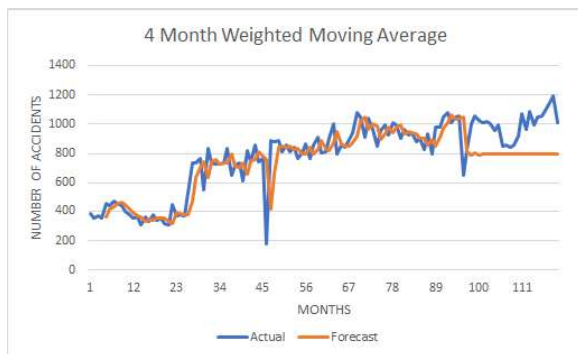
**Figure 3.1.4.** 12-Month Simple Moving Average 2010 to 2019

It is observed from all the moving averages constructed, even in the following different moving averages, that the forecasted values appear to flatten starting from the data point of 2018. This is caused by the reliance of the moving average on past values for their current value as Salkind in 2007 stated.

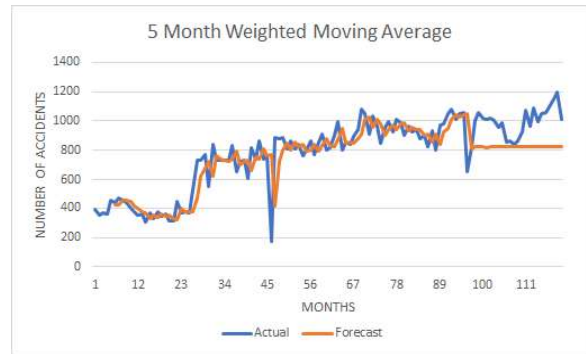
### 3.2 Weighted Moving Average



**Figure 3.2.1.** 3-Month Weighted Moving Average 2010 to 2019



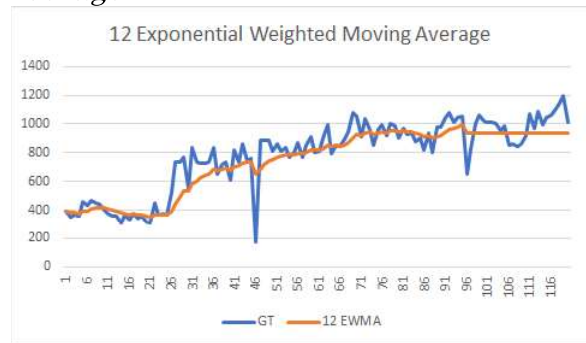
**Figure 3.2.2.** 4-Month Weighted Moving Average 2010 to 2019



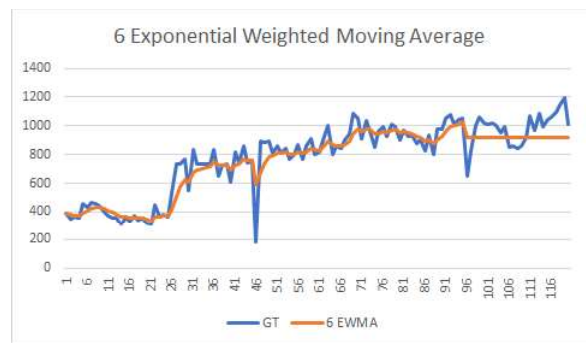
**Figure 3.2.3.** 5-Month Weighted Moving Average 2010 to 2019

The flattening of the forecasted data points from 2018 can still be observed. However, the WMA tends to stay flattened even with the increasing months being applied. This is because of the weights assigned in the MA, compounding the averages calculated, and prevents even a slight change in the forecasted value.

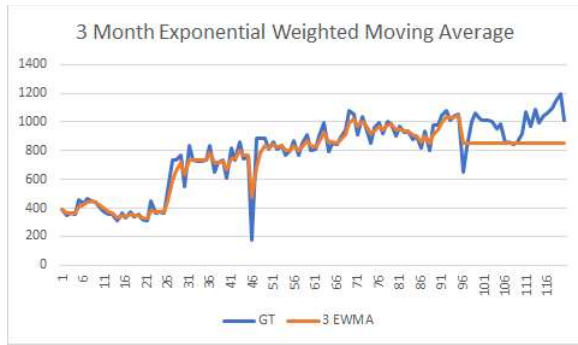
### 3.3. Exponential Weighted Moving Average



**Figure 3.3.1.** 12-Month Exponential Weighted Moving Average 2010 to 2019



**Figure 3.3.2.** 6-Month Exponential Weighted Moving Average 2010 to 2019

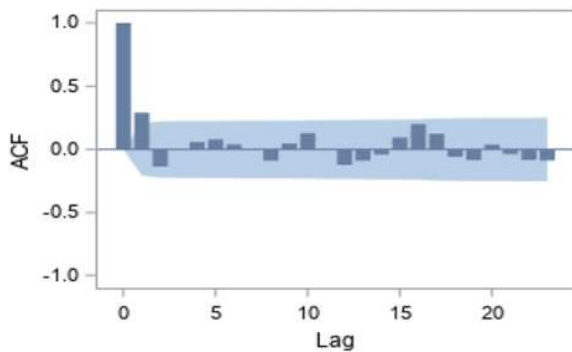


**Figure 3.3.3.** *3-Month Exponential Weighted Moving Average 2010 to 2019*

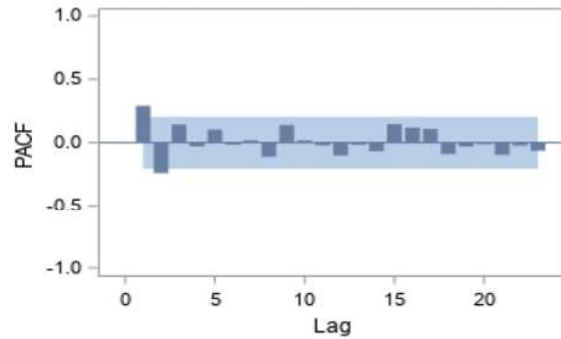
Similar to the previous moving averages, the forecasted data flattens after a few data points from the last known data point due to their dependency on the past values.

### 3.4 ARIMA

Based on the graphs of the grand total, it is visually evident that the data is not stationary. With that, the researchers differenced the data by one degree. The Augmented Dickey-Fuller Test yielded a p-value of less than 0.01%; therefore, the null hypothesis that a unit root exists is rejected; ergo, the data is stationary (see Appendix B). Furthermore, the researchers utilized the autocorrelation function (ACF), showing how the present data is affected by q lags in time of data, and partial autocorrelation function (PACF), explaining the correlation between the series and its lags denoted by p, to determine the autoregressive and moving average order appropriate for the forecast.



**Figure 3.4.1.** *Autocorrelation Function (ACF) Plot*



**Figure 3.4.2.** *Partial Autocorrelation Function (PACF) Plot*

Based on the plots formed by SAS, the ACF plot cuts off after the 1st lag indicating 1st order moving average. Meanwhile, the PACF plot shows gradual decay which indicates that the most fitting autoregressive order is 0. With the gathered data, the ARIMA model for the forecast is ARIMA (0,1,1).

**Table 3.4.2.** *ARIMA Test Forecast*

| Month          | Forecast   | Actual Value | Squared Error | Percentage Error |
|----------------|------------|--------------|---------------|------------------|
| August 2019    | 709        | 1059         | 122500        | 49.36530324      |
| September 2019 | 712        | 1093         | 145161        | 53.51123596      |
| October 2019   | 714        | 1147         | 187489        | 60.6442577       |
| November 2019  | 717        | 1196         | 229441        | 66.80613668      |
| December 2019  | 720        | 1010         | 84100         | 40.27777778      |
|                | <b>MSE</b> | 102546.6     | <b>MAPE</b>   | 44.7168%         |

Table 3.4.2 (see Appendix C for full table) shows the forecasted values compared to the actual values. The MSE and MAPE of the data are 102546.6 and 44.7168%, respectively.

### 3.5 Measures of Forecasting Accuracy

The researchers determined that the most fitting models to be used for each method are the 6-month MA, 5-month WMA, 6-month EWMA as they had the smallest MAPE value for each of their methods (See Appendix D). Meanwhile, the ARIMA had a MAPE of 44.72%.



### 3.6 Chi-Square Testing of Multiple Proportions

**Table 3.6. Chi-Square Results**

| Accident Causation | Observed | Expected | $\chi^2$            |
|--------------------|----------|----------|---------------------|
| Human Error        | 76       | 39.3     | 34.27201            |
| Non-human Error    | 10       | 39.3     | 21.84453            |
| DUI                | 32       | 39.3     | 1.35598             |
| Critical Value:    | 5.991    |          | $\chi^2$ : 57.47252 |

The data that the researchers received was the accident causation factors for 2019 Motorcycle-related accidents. 99% of the data were “No Accident Factor”, meaning that the police blotter book did not have any recorded cause of the accident. The researchers excluded this data for the test as this tips the scale highly. The researchers also merged the vehicle defect, mechanical defect, and “other” factors as they had the same classification — beyond the driver’s control; this is labeled as “Non-human Error”.

Based on the  $\chi^2$  value yielded from this, there is a significant difference between the accident causation factors. The human error appears to be the most significant factor. This includes drivers falling asleep and losing control of their vehicles.

### 3.7 Forecast

**Table 3.7. Forecasted Data**

| Month                  | 6-month MA | 5-month WMA | 6-month EWMA | ARIMA(0,1,1) |
|------------------------|------------|-------------|--------------|--------------|
| August 2021            | 1099       | 1074        | 1080         | 1115         |
| September 2021         | 1099       | 1074        | 1080         | 1120         |
| October 2021           | 1099       | 1074        | 1080         | 1125         |
| November 2021          | 1099       | 1074        | 1080         | 1130         |
| December 2021          | 1099       | 1074        | 1080         | 1135         |
| % difference from 2019 | +8.81%     | +6.34%      | +6.93%       | +12.38%      |

As seen in the table above (See Appendix E-I for complete details), all models indicate an increase by the end of 2021 from the data as of December 2019. This may be attributed to the fact that there is a yearly increase in the number of cars purchased and on the road. Unless proper action is taken, the forecast is bound to continue on an uptrend.

## 4. CONCLUSION

With the increase in road accidents, the increase in the nation’s economic loss due to road traffic accidents is bound to increase, similar to the study by Lam et al. in 2018 has stated. However, the researchers are well aware that the forecast may be

inaccurate for 2020 and 2021. As lockdowns continue to ensue, more people are impelled to stay at home; therefore, road accidents have lessened. Despite the reduced economic impact due to road accidents for the years 2020-2021, the Asian Development Bank estimates that the pandemic will deter the GDP growth of the nation by 10% for 2020 and 2021 (De Vera, 2020).

From the methods applied, the least MAPE was the 6-month EWMA at 10.33%. This percentage error is considered acceptable given the context of forecasting; however, the researchers recommend using ARIMAX and other forecasting techniques. Furthermore, the researchers suggest that future studies include studying correlations of factors that contribute to road accidents, such as the number of cars on the road.

Moreover, the MMDA, along with the Philippine National Police, have to investigate road accidents thoroughly as the number of “No Accident Factor” comprised 99% of the data, making it hard for researchers as well as road safety practitioners to identify the cause of accidents for them to be prevented. Furthermore, motorists have to be more cautious as this study has found that the leading cause of motorcycle accidents are due to human error; therefore, the strict implementation of the Anti-Distracted Driving Act of 2016 is highly recommended by the researchers.

## 5. ACKNOWLEDGEMENTS

The researchers would like to thank their adviser, Mrs. Shirlee Ocampo. Without her advice and guidance, the researchers would not have been able to accomplish the research. The researchers would also like to thank the Metropolitan Manila Development Authority for providing the data used.

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## 7. APPENDICES

**Table 2.2. Variables and Descriptions (Appendix A)**

| Variable                      | Description   |
|-------------------------------|---|
| Year                          | The year that the data represents.  |
| Time                          | The timeframe of each month in each year.   |
| Damage to Property            | Number of accidents which only damaged properties.  |
| Fatal                         | Number of accidents which resulted in death.  |
| Non-fatal Injuries            | Number of accidents that inflicted non-fatal injuries to the victims.   |
| Grand Total                   | Summation of the three types of accidents monthly.  |
| Human Error                   | Number of accidents wherein the cause of the accident is the driver's fault (i.e., fell asleep, lost control)                       |
| Mechanical Defect             | Number of accidents wherein the cause of the accident is due to faulty system of the engine (i.e., electrical problem, loose brake) |
| Other                         | Number of accidents wherein the cause of the accident may be associated with the environmental factors.                             |
| Under the Influence of Liquor | Number of accidents wherein the cause of the accident is due to the driver driving under the influence of alcohol                   |
| Vehicle Defect                | Number of accidents wherein the cause of the accident is due to a malfunction in the vehicle (i.e. exploded or flat tire)           |
| No Accident Factor            | Number of accidents wherein the cause of the accident was not determined by the police.   |

**Table 3.4.1. Augmented Dickey-Fuller Test (Appendix B)**

| Augmented Dickey-Fuller Unit Root Tests |      |          |          |        |          |               |
|---|------|----------|----------|--------|----------|---------------|
| Type                                    | Lags | Rho      | Pr < Rho | Tau    | Pr < Tau | F Pr > F      |
| Zero Mean                               | 0    | -140.037 | 0.0001   | -15.48 | <.0001   |               |
|   | 1    | -199.207 | 0.0001   | -9.27  | <.0001   |               |
|   | 2    | -731.986 | 0.0001   | -7.94  | <.0001   |               |
| Single Mean                             | 0    | -140.303 | 0.0001   | -15.43 | <.0001   | 119.07 0.0010 |
|   | 1    | -202.704 | 0.0001   | -9.26  | <.0001   | 42.96 0.0010  |
|   | 2    | -875.370 | 0.0001   | -7.98  | <.0001   | 31.92 0.0010  |
| Trend                                   | 0    | -140.313 | 0.0001   | -15.38 | <.0001   | 118.56 0.0010 |
|   | 1    | -202.988 | 0.0001   | -9.25  | <.0001   | 42.94 0.0010  |
|   | 2    | -894.188 | 0.0001   | -7.98  | <.0001   | 32.05 0.0010  |

**Table 3.4.2. ARIMA Forecast (Appendix C)**

| Month | Forecast   | Actual Value | Squared Error | Percentage Error |
|-------|------------|--------------|---------------|------------------|
| 97    | 656        | 828          | 29584         | 26.2195122       |
| 98    | 659        | 1005         | 119716        | 52.50379363      |
| 99    | 661        | 1059         | 158404        | 60.2118003       |
| 100   | 664        | 1022         | 128164        | 53.91566265      |
| 101   | 667        | 1013         | 119716        | 51.87406297      |
| 102   | 670        | 1016         | 119716        | 51.64179104      |
| 103   | 673        | 1005         | 110224        | 49.33135215      |
| 104   | 675        | 953          | 77284         | 41.18518519      |
| 105   | 678        | 991          | 97969         | 46.16519174      |
| 106   | 681        | 853          | 29584         | 25.25697504      |
| 107   | 684        | 861          | 31329         | 25.87719298      |
| 108   | 686        | 842          | 24336         | 22.74052478      |
| 109   | 689        | 860          | 29241         | 24.81857765      |
| 110   | 692        | 922          | 52900         | 33.23699422      |
| 111   | 695        | 1072         | 142129        | 54.24460432      |
| 112   | 698        | 967          | 72361         | 38.53868195      |
| 113   | 700        | 1085         | 148225        | 55               |
| 114   | 703        | 995          | 85264         | 41.53627312      |
| 115   | 706        | 1047         | 116281        | 48.30028329      |
| 116   | 709        | 1059         | 122500        | 49.36530324      |
| 117   | 712        | 1093         | 145161        | 53.51123596      |
| 118   | 714        | 1147         | 187489        | 60.6442577       |
| 119   | 717        | 1196         | 229441        | 66.80613668      |
| 120   | 720        | 1010         | 84100         | 40.27777778      |
|       | <b>MSE</b> | 102546.6     | <b>MAPE</b>   | 44.7168%         |

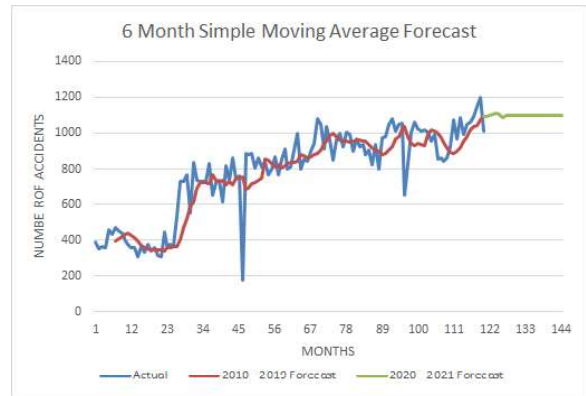
**Table 3.5. Measures of Forecasting Accuracy (Appendix D)**



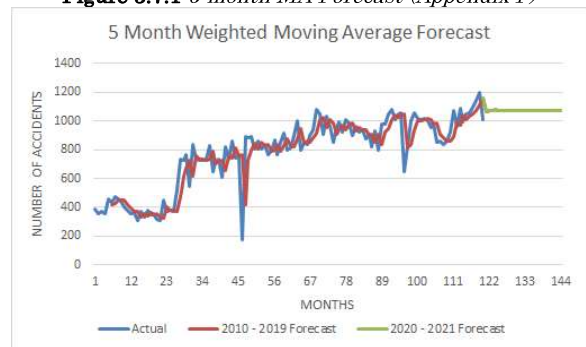
|               | MSE         | MAPE   |
|---------------|-------------|--------|
| 2-month SMA   | 22330.29    | 14.44% |
| 6-month SMA   | 14377.57    | 12.99% |
| 12-month SMA  | 16638.45    | 14.08% |
| 3-month WMA   | 20890.69    | 14.76% |
| 4-month WMA   | 21888.70    | 14.94% |
| 5-month WMA   | 19720.10    | 14.48% |
| 1-month EWMA  | 126541.21   | 33.82% |
| 3-month EWMA  | 30541.30    | 14.23% |
| 6-month EWMA  | 14943.52002 | 10.33% |
| 12-month EWMA | 14924.23738 | 10.61% |

**Table 3.7.1.** 2020-2021 Forecast Summary (Appendix E)

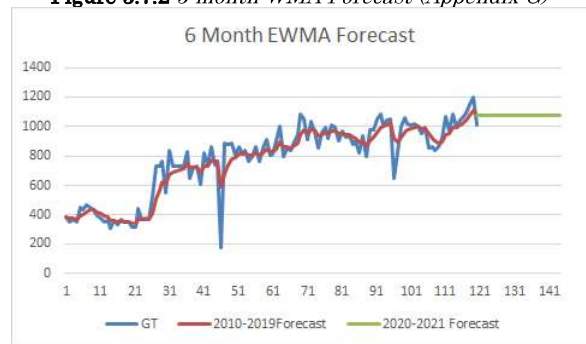
| Month                  | 6-month MA | 5-month WMA | 6-month EWMA | ARIMA(0,1,1) |
|------------------------|------------|-------------|--------------|--------------|
| January 2020           | 1092       | 1068        | 1080         | 1015         |
| February 2020          | 1100       | 1074        | 1080         | 1020         |
| March 2020             | 1106       | 1076        | 1080         | 1026         |
| April 2020             | 1108       | 1078        | 1080         | 1031         |
| May 2020               | 1102       | 1073        | 1080         | 1036         |
| June 2020              | 1086       | 1074        | 1080         | 1041         |
| July 2020              | 1099       | 1074        | 1080         | 1047         |
| August 2020            | 1100       | 1074        | 1080         | 1052         |
| September 2020         | 1100       | 1074        | 1080         | 1057         |
| October 2020           | 1099       | 1074        | 1080         | 1062         |
| November 2020          | 1098       | 1074        | 1080         | 1067         |
| December 2020          | 1097       | 1074        | 1080         | 1073         |
| January 2021           | 1099       | 1074        | 1080         | 1078         |
| February 2021          | 1099       | 1074        | 1080         | 1083         |
| March 2021             | 1099       | 1074        | 1080         | 1088         |
| April 2021             | 1099       | 1074        | 1080         | 1094         |
| May 2021               | 1098       | 1074        | 1080         | 1099         |
| June 2021              | 1099       | 1074        | 1080         | 1104         |
| July 2021              | 1099       | 1074        | 1080         | 1109         |
| August 2021            | 1099       | 1074        | 1080         | 1115         |
| September 2021         | 1099       | 1074        | 1080         | 1120         |
| October 2021           | 1099       | 1074        | 1080         | 1125         |
| November 2021          | 1099       | 1074        | 1080         | 1130         |
| December 2021          | 1099       | 1074        | 1080         | 1135         |
| % difference from 2019 | +8.81%     | 6.34%       | 6.93%        | +12.38%      |



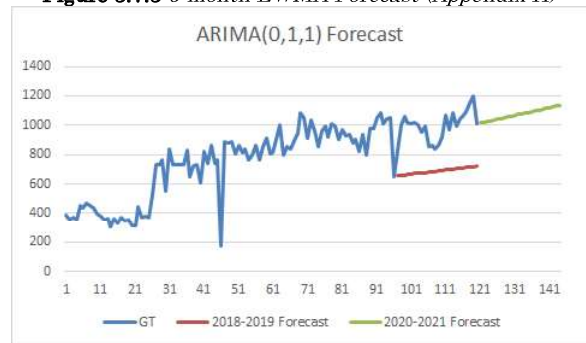
**Figure 3.7.1** 6-month MA Forecast (Appendix F)



**Figure 3.7.2** 5-month WMA Forecast (Appendix G)



**Figure 3.7.3** 6-month EWMA Forecast (Appendix H)



**Figure 3.7.4** ARIMA(0,1,1) Forecast (Appendix I)





## Perspective on Employment Opportunities of People with Disabilities in San Gabriel, La Union

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**Abstract:** For PWDs, employment is not only a way to gain income; it also gives a chance to showcase untapped skills, provide opportunities and allow social inclusion. However, PWDs still experience common patterns of discrimination and suffer high unemployment rates. In spite of several promotions worldwide, the employment rate is considerably lower for PWDs than for people without disabilities. This study sought to know the status of inclusion of PWDs in employment in San Gabriel, La Union, the opportunities present, and the interventions to address them. The descriptive qualitative design was utilized in this study. A semi-structured interview was conducted with the PWDs. Thematization was used to analyze the responses. Results revealed that the respondents face difficulties in finding a job before the pandemic because of the limited number of jobs available and became even more challenging during the pandemic due to imposed restrictions. Although they find it difficult because of limitations, results showed that they are not discriminated against in the workplace. Moreover, the available employment opportunities for PWDs are classified under blue-collar jobs. Additionally, respondents recommend giving attention to PWDs in order to address the employment opportunities through interventions. The researchers concluded that the status of inclusion of PWDs in employment is considerably low because of the limited jobs available. Similarly, work opportunities are also insufficient. Interventions to address the employment opportunities include facilitating programs and skills training for PWDs and opening simple job positions in the municipality or barangays.

**Key Words:** PWDs; employment; opportunities; interventions; difficulties

### 1. INTRODUCTION

#### 1.1. Background of the Study

Just like everyone, PWDs also desire a steady and productive life. Employment not only provides an avenue to be productive and to showcase untapped skills and provides an income that can be used for daily needs, but it will also give opportunities and allow social inclusion, which is significantly important for PWDs. Despite this importance and the right of every person to have access to a job without being discriminated against, people with disabilities experience common patterns of discrimination. They suffer high unemployment rates, are confronted with prejudices regarding their productivity, and are often excluded from the labor market. They also face discrimination at the hiring stage (International Labor Organization, 2021).

The issue of disability and employment has taken center stage in the global arena because it spans several areas of the United Nations Sustainable Development Goals (United Nations Department of

Economic and Social Affairs, 2016). Literature on the employment of PWDs indicates that significant differences exist in the employment experiences between PWDs and persons without disabilities.

Governments worldwide are trying to promote the employment of PWDs by motivating workforce participation and reducing discriminatory tendencies. On the supply side, some governments have started welfare reform programs that encourage PWDs to participate in the workforce. However, in spite of several promotions worldwide, international data from the World Health Organization (WHO, 2020) reveals that the employment rate is considerably lower for women with disability at 20% and men with disability at 53% than that of women without disability at 30% and men without disability at 65%.

Of the 92.1 million households in the Philippines, 1.57% or 1.44 million people had a disability based on the most recent data on people with disabilities found on the 2010 Census of Population and Housing (Philippine Statistics Authority, 2013). Nevertheless, economic



participation is still hard to obtain for most PWDs. According to Schelzig (2005), out of more than 100,000 employable PWDs registered with the Department of Labor and Employment (DOLE), there are only less than 10% of them in wage employment.

A study by Mina (2017) in Cebu, Philippines, on factors that contribute to low employment of persons with disabilities include the lack of employment opportunities within the community of the PWDs. It is stated that the majority of the few formal establishments that hire PWDs are within urban places such as the city and are far from rural areas. In addition, some of the informal enterprises that employ PWDs are carinderias or small eateries that give lower wages and do not include benefits such as bonuses, health care, and leaves.

This study aimed to explore the perspectives on employment opportunities of persons with disabilities in San Gabriel, La Union. This is significant in order to see the point of view of PWDs on employment in their community. This study gives awareness on the current status of inclusion of PWDs in employment and the opportunities that are available for them in the field whether it be sufficient. This study sought to present interventions that could address the present employment opportunities in the said locale.

### *1.2. Statement of Objectives*

This study aimed to investigate the perspective on employment opportunities of people with disabilities in San Gabriel, La Union. Specifically, it seeks to answer the following questions:

1. What is the current status of the inclusion of PWDs in employment in San Gabriel?
2. What opportunities are available for PWDs in San Gabriel, and are they sufficient?
3. What are the interventions to address the employment opportunities in San Gabriel?

## **2. METHODOLOGY**

### *2.1. Research Design*

Give the support for your main claim by This study utilized a descriptive qualitative research design to have an in-depth and comprehensive look at the specific events experienced by individuals or groups of individuals (Lambert & Lambert, 2012). This method underpins how the researchers came up with interventions to address the employment opportunities of PWDs in San Gabriel, La Union.

### *2.2. Participants and Locale of the Study*

The respondents of the study were the PWDs residing at San Gabriel, La Union, who are legally considered adults. A total of 10 respondents were interviewed. The participants include PWDs who are

of the working-age from 18 years old and above who have tried applying for a job, regardless of their employment status at the present time. This also includes retired PWDs. Purposive sampling was used in this study.

### *2.3 Data Gathering Instrument*

A semi-structured interview was conducted to allow the researchers to have a keen understanding of the topic of interest. The researchers utilized a list of paper-based interview guides that contained open-ended questions.

### *2.4 Data Gathering Procedures and Ethical Considerations*

A letter of approval was sent to the principal of LORMA Colleges for the researchers to conduct this study, and a letter of consent was given to the respondents. Because of the current situation caused by the pandemic, social meetings are limited physically. Thus, the researchers conducted the interview with the respondents online.

### *2.5 Data Management*

Thematization was used to analyze the data to be gathered in this study in order for the researchers to effectively organize and cluster specific key subjects from the answers of the respondents that are recurrent.

## **3. RESULTS AND DISCUSSION**

### *3.1 Current Status of Inclusion*

#### *3.1.1 Employment Accessibility*

More than half of the respondents admitted that it is difficult for them to find a job in the locale. Participants said that they find it difficult because of their disability and because there are limited jobs available for PWDs in San Gabriel. On the other hand, one respondent, respondent B, said that it is easy to find a job because he became well known for what he does, and other shop owners even offer him a position in their establishments. It can be inferred that for the majority of PWDs in San Gabriel, it is difficult to acquire a job, especially since most of them do not have the privilege of being known, unlike respondent B.

#### *3.1.1.1 Before the Pandemic*

The majority of the respondents admitted that they consider finding a job pre-pandemic as challenging and difficult because of the lack of availability of employment in San Gabriel. Conversely, there are two (2) respondents who admitted that it is easy for them to look for jobs despite indifferent circumstances and personally believes that work before the pandemic is favorable.



### *3.1.1.2 During the Pandemic*

All the respondents said that it is even more difficult to find a job during the pandemic. The respondents mentioned that because of the decline of businesses and the present situation, there are only a small number and certain types of job opportunities left for the PWDs in San Gabriel. Moreover, because mobility is restricted, it is more challenging for them to find jobs because they cannot go to other places. Furthermore, the devastating effect of the pandemic on employment is evident around the world, affecting people of different gender, race, ethnicity, education level, age, and occupations (Lee et al., 2021) and thus include PWDs.

### *3.1.2 Acceptance in the Employment Sector*

According to all of the interviewed PWDs, there were no instances wherein they avoided applying to certain establishments because they knew that they would not be accepted because they are considered PWDs. Similarly, there were also no instances wherein they were rejected in an establishment just because they are PWDs. Thus, this implies that PWDs in San Gabriel are not discriminated against and are accepted in the workplace. This then eliminates discrimination as a factor for having difficulty in acquiring jobs. With this, when PWDs are not discriminated against and are accepted in the workplace, they perform better on their jobs, and they feel more supported. (Zhu et al., 2019)

## *3.2 Availability and Sufficiency of Work Opportunities*

### *3.2.1 Common Work Avenues*

The respondents have observed that the common jobs that PWDs have depend on their capability to do work. This is backed by Seva's (2020) study which says that when the right task or job is given to a PWD in consideration of their capabilities, their performance will be positive, thus allowing them to exhibit good work.

#### *3.2.1.1 Cleaning Services and Waste Management*

Among the ten (10) respondents interviewed, four (4) answered that one of the most common jobs of PWDs in San Gabriel falls in the cleaning services and waste management industry. This includes janitorial works like road sweeping and garbage collection.

#### *3.2.1.2 Farming/Agriculture*

Farming or agricultural work is also common for PWDs as the locale has the highest percentage of agricultural land in the whole province (La Union

Tayo!, 2021). However, the respondents mentioned that farm work is intermittent; thus when farming season ends, work also ends.

### *3.2.1.3 Beauty and Health*

According to the respondents, jobs in the beauty and health industry are also common employment for PWDs in San Gabriel. Specifically, these jobs are hairdressers, hair cutters, barbers, and masseurs.

#### *3.2.1.4 Construction, Repair, and Maintenance*

Work as an electronic repairman, maintenance, and carpenter are also common for PWDs in San Gabriel. According to respondent A, although he did not study electronics, he was fond of it, which allowed him to use it for a living by repairing electronics such as electric fans.

### *3.2.2 Adequateness of Work Opportunities*

The majority of the respondents are fully aware of the employment opportunities for them as PWDs in San Gabriel. Nevertheless, results reveal that even though the majority are aware of their employment opportunities, the majority still believes that these are not enough for the PWDs in San Gabriel because they find it significantly difficult to find a stable job in order for them to make a living due to the scanty amount of jobs that they can be hired in. This is backed up by the study of Othman & Jani (2017), which revealed that the employment opportunities of PWDs are limited because of their impairment.

## *3.3 Interventions to Address the Employment Opportunities*

### *3.3.1 Facilitation of Programs and Training*

Among the ten (10) respondents, four (4) of them suggested the conduct of programs and training for PWDs who aspire to learn about different skills that could help them in their livelihood and for them to be employed easier. Specifically, the respondents were pertaining to the free skills training for PWDs by the Technical Education and Skills Development Authority (TESDA) and the National Council on Disability Affairs (NCDA) so that they could receive the National Certificate (NC) which is necessary for job application. The respondents also recommended the provision of basic equipment for their corresponding skill paths, such as screwdrivers and the like, which could be a big help that they could use for daily income. A study by Majid and Razzak (2015) revealed that vocational training and programs are helpful in the rehabilitation of PWDs. This is because vocational training allows PWDs to acquire an



appropriate job that suits them and moreover in congruence to their vocational potential and thus enables them to advance in it and be successful.

### 3.3.2 *Employment Offers for PWDs*

Because most of the PWDs settle on jobs that are intermittent, income is also discontinuous. Hence, the respondents recommend opening simple job positions for PWDs such as those whose duties can be considered doable for them, including jobs of the same kind as janitorial positions in the municipality or the barangay in order for them to have a continuous and stable income. A study by Marcella & Nalumen (2020) says that the provision of an adequate standard of living that includes a basic level of security of income helps reduce the levels of vulnerability and poverty of PWDs.

## 4. CONCLUSIONS

Based on the findings of the study, the following conclusions were derived:

First, the status of inclusion of PWDs in employment in San Gabriel is explained through two (2) themes, namely Employment Accessibility and Acceptance in the Employment Sector. The majority of the respondents face difficulties in accessing employment. It was difficult for PWDs before the pandemic and became even more difficult during the pandemic because of restrictions. On the other hand, PWDs in San Gabriel are accepted in the employment sector as they are not discriminated against when applying for a job. Nevertheless, the current status of inclusion of PWDs in San Gabriel is considerably low, even though they are not discriminated against in the employment sector, given that the majority still faces difficulties in employment accessibility because of the limited jobs available for them.

Second, salient findings of the study revealed that the most common types of jobs of PWDs in San Gabriel are classified under blue collar jobs. Specifically, these include haircutter or barber, hairdresser, masseur, carpenter, agricultural work, janitorial work, and electronics repairman. However, the work opportunities in San Gabriel for PWDs are still not sufficient because of the limited number of jobs that PWDs can get hired for.

Lastly, based on the findings of the study, two interventions were proposed to address the employment opportunities in San Gabriel, La Union. First, programs and training for PWDs should be conducted. Specifically, this pertains to the free skills training for PWDs by TESDA and NCDA. In addition, basic equipment for their corresponding skill paths should also be provided. Secondly, opening simple job positions for PWDs such as janitorial positions in the municipality or the barangay is also proposed in order for them to have a continuous and stable income.

## 5. ACKNOWLEDGMENTS

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## Senior High School Students' Political Participation in the Emerging Social Issues

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**Abstract:** This research examined youth political participation in the emerging social issues in the Philippines. The purpose of this study is to exhibit the vital political participation of senior high school students in the Humanities and Social Sciences (HUMSS) strand of Tanauan City Integrated High School in terms of finding solutions for the various social issues that have been hindering the country from developing. The research question guiding the study is how the youth understand and value interests in social issues in relation to the other forms of political participation. This study employed a qualitative research approach used to analyze data gathered for this study based on 42 respondents. The results indicated that the youth or the present generation has a wide perspective when it comes to political involvement and related concepts. However, the youths expressed that political activities beyond voting facilitate them with opportunities to communicate more specific political messages to politicians multiple times. Voicing out, participating in civic activities, such as rallies and campaigns, and stating and influencing others are some of their ways to engage politically. With some barriers and hindrances young people encountered, they have this eagerness to stand up and enrich their knowledge for the betterment of the country.

**Key Words:** awareness; political efficacy; political participation; social issues; youth

### 1. INTRODUCTION

Young people are often excluded or overlooked as political participants regarding diverse issues and problems encountered by a country. The lack of interest in this generation is the result of systematic disregard for government officials because of their young age, limited opportunity, and lack of experience and knowledge in the field of politics. On the other hand, Cabo's (2018) research has proven that the presence of youth in political actions has significant benefits in decision-making and steps in resolving social issues. Freechild (2016) explained that there is a growing interest in youth and politics around the world that made some political groups change their way to respond to the growing number of young people who want to affect the political system. The participation of political youth has benefitted all citizens and the whole society.

The Philippines is generally a third world country and one of the developing countries around the globe. There are many challenges that the country is currently facing to advance and improve its way of living. Social issues such as poverty, anti-terror bill, new normal setup in the platform of education, global pandemic, and climate crisis are some of the biggest problems that need to be addressed. These emerging social issues initiate the start of a bold, attentive, and politically aware generation that stands for

democracy.

Through the years, the Filipino youth has emerged as a powerful force in shaping the nation. The public has witnessed them forward their agenda on various socio-political matters, whether out in the streets or within their circles. Constituting 30% of the Philippine population, the youth's civic participation is fundamental in realizing the values of democracy and good governance (Medina, 2019).

### 2. METHODOLOGY

This chapter describes the nature of the study in terms of research design, respondents of the study, data gathering instrument, analysis, and interpretation of data.

This study employed a qualitative research approach used to analyze data gathered for this study. Data from these resources was collated and macro-analyzed with a heavy emphasis on the knowledge and participation of Filipinos towards key national issues. This study aims to review the awareness and practices of 42 senior high school students of Tanauan City Integrated High School and come up with data that may be used to see the political awareness and participation of the senior high school students. The study uses the descriptive research design and intends to use a questionnaire to gather the needed data to review the political participation of senior high school



students.

To produce valid and reliable results of this study, the respondents were selected through purposive sampling. This sampling method requires the researchers to have prior knowledge about the purpose of their studies so that they can properly choose and approach eligible participants. The researchers want to access a particular subset of people as all participants of this study are selected because they fit this particular profile.

The respondents of this study are grade 11 and grade 12 students under the Humanities and Social Sciences (HUMSS) strand of Tanauan City Integrated High School. They were chosen to be the respondents of this study since they have an overview and knowledge about Philippine Politics and Governance under the K to 12 Basic Education Curriculum for senior high school.

In order to elicit the information needed in this study, the researchers decided to use a self-constructed validated questionnaire. This was done after intensive research from various sources and with close coordination and consultation with the research adviser. Moreover, the questionnaire underwent content validation.

The questionnaire was submitted to the research adviser for checking for possible corrections. Afterward, it was examined by the researchers' internal and external validators for the grammatical and structural construction correction. The researchers modified the questions so that they could apply them accordingly to the purpose of this study.

A three-section survey questionnaire was used in this study. A questionnaire is used when factual information is desired. This gives opportunity for the person administering the instrument to properly explain the purpose of the study and its terms and to accurately acquire and assess information. Section (1) draws information about the socio-demographic profile of the respondents, which includes name, gender, and level of education, but it is optional. Section (2) of the questionnaire evaluates the awareness of the respondents about politics and any related topics. The questions were designed to assess the awareness of the respondents in social issues and are based on contemporary political and current issues in the country. Section (3) determines the stage of practice of the respondents in acquiring information about politics and the involvement of the respondents in politics appropriate for their age and level of education. The questions regarding the practice and the involvement of the respondents are about the efforts of the respondents in understanding politics and in reacting to political issues.

The researchers sought permission from the school head of the Tanauan City Integrated High School to administer the questionnaires through a

request letter that was sent online. The questionnaires were distributed via Google form, text messages, and private message in Messenger. At the start of distributing questionnaires to the persons of interest, pertinent ethical considerations were observed. Specifically, permission was sought from the respondents regarding the use of their information, and answers are still bound to follow the Data Privacy Act and related issuances about the processing of personal data, upholding the rights of their data subjects and maintaining compliance with other provisions that are not incompatible with the protection provided by the implementing rules and regulations of Data Privacy Act of 2012. Respondents were also given an opportunity to ask questions about the research.

Recording and organizing of written responses were used to determine the awareness of senior high school students and their own political participation in the present times. The researchers analyzed all the answered questionnaires for analysis and interpretation of the data. The researcher evaluated the result carefully. Analysis and interpretation of every item in the questionnaire was done by the researcher in order to come up with meaningful findings and conclusions and draw some contributing recommendations.

### 3. RESULTS AND DISCUSSION

The findings showed the visible political participation of senior high school students in the present times. This general presentation preceded the identification of the level and application of selected students when it comes to their political perspective in the Philippines.

#### *3.1 Forms of Political Participation*

To bring about the needed changes in society, some participants stated that they should engage in prosocial acts. Voicing out, participating in civic activities such as rallies and campaigns, and stating and influencing others are some ways to engage politically. Another way of participating politically is to avoid criminal activities, avoid deviant peer groups, be good citizens who follow laws, or choose to act in morally devoted ways. Youth political participation can thus take many forms ranging from traditional democratic politics to more creative, novel, and remarkably distinctly contemporary forms, shaped and inspired by their particular socio-political backgrounds and global social movements (Cabo, 2018). Additionally, young people focus more on online political participation in the sense that it is more convenient and can be accessed with ease. As Batool et al. (2020) suggest, social media has a crucial role in constructing political efficacy and political



participation working under Uses and Gratification, Media Richness, and Social Engagement theories. This shows that there is a great effect that social media offers on accessing information and participating politically. It proves that the youth has contributed to changing the mode of protest from streets to cyberspace (Lim, 2009).

### *3.2 Awareness of Social Issues*

Diverse answers were recorded when it was asked what their top five social issues in the Philippines are. Generally, seven concepts were tabulated from their responses. These are societal problems, the pandemic, poor governance, pollution, economy, and education. The majority of the respondents showed interest in participating in solving social issues. In addition, most of the respondents have linked being aware of the emerging social issues and their political participation. The respondents emphasized that if a person deeply understands the emerging social issues, it will enable them to pave the way for change and improvement. They are willing to take small actions to make big changes even though they're only students. The response of one participant explains this: "Even though I am not legally credible to make change for the welfare of this country, awareness as a student is enough as of the moment which I can apply in the future."

This supports the analysis of Cabo (2018) that each generation developed its own variety of behaviors and viewpoints, including awareness of social issues and politics, shaped and influenced by major historical and social changes that happened during their formative years.

### *3.3 Youth Perspective on Performing Political Participation*

There are functions and purposes of political participation that arise in the survey. The respondents see political participation as part of self-development and an eye-opener. Also, it arises that political participation is a beneficial tool for youth because once we are aware of which leads to our capability to do something, we can make a change. As Checkoway (2011) suggests, youth participation strengthens personal and social development, provides expertise for children and youth programs and services, and promotes a more democratic society. This is shown on their responses on having the eagerness to bring a clean and equal government for all. However, some of the respondents expressed their opinion that political participation is not beneficial for them because they are not totally interested in this kind of matter. The respondents stated that they are not taking it seriously and not letting these issues

fully overcome by anything that has an involvement with politics. These findings were associated with Grasso's (2014) analyses that today's youth is the least politically engaged generation when it comes to formal and informal political participation. In addition, 'Millennials' seem to be a 'unique' generation, disengaged from any form of political participation (Fox, 2015).

Overall, the youth have different perspectives on this kind of motive. The majority of the respondents illuminate the purpose of the application of involvement in political participation, but some of them have not yet ignited the match and the light of political participation in their lives, so they stated that it is not profitable for them.

### *3.4 Promoters of Political Participation*

There were important themes that emerged from the participants' responses on what can facilitate and strengthen their application of political participation. The first theme had to do with trust in oneself. A second theme had to do with the possession of knowledge. The third theme was concerned with the sense of commitment one has in performing one's duties in society. The inner courage, a sense of determination, a resolve to increase one's knowledge, and an emphasis on the obligation to the performance of one's duties were indicative of the youth awareness that political action springs from within and not from the persuasion of others (Cabo, 2018). Moreover, the respondents also highlighted that political efficacy is very influential when it comes to dealing with political stances, as the confidence that an individual plays a major role in promoting change for the sake of the country. Furthermore, there are important roles education carries to build youth with critical minds on solving country's problems. There are four reasons why education affects the political participation of the students. First, it gives awareness to every learner. Second, education is the strongest foundation of knowledge. Third, education nurture our decision-making skills. Lastly, education gives enlightenment. These themes and factors promote and toughen political participation among youth.

### *3.5 Barriers to Political Participation*

There were general barriers that emerged from the participants' responses. As Farthing et al. (2010) indicated on their research, participation in political activities is in crisis, especially when it comes to young people, and this is a major issue facing contemporary democracies. These blocks include differences in age, fear of the possible consequences of partaking, and the lack of time and knowledge on social issues. This is related to the analysis of Bunquin (2020) that the youth do not engage in conversations





related to political issues because they are prone to inequality. Also, they are afraid of the possible consequences of their involvement that can put their lives at risk. Youth are degraded because of their young age and not having adequate time on accumulating knowledge that excluded them to participate politically.

#### 4. CONCLUSIONS

Based on the findings of the study, the following conclusions were made:

Different themes on the forms of political participation, and barriers and promoters of engagement highlighted the importance given by the youth to the interactions with others and the influence of new technology in the conduct of political activities. The emphasis on prosocial behaviors as forms of political action and having enough knowledge about social issues as an important support for the maintenance of political action was remarkable. Most of the responses indicated that being socially aware will light up the fire in our hearts to contribute in the political process or participation in the country.

Young people focus more on online political participation in the sense that it is more convenient and can be accessed with ease. Moreover, online channels are frequently used mostly for searching political information, reading articles and news, among others.

Most of the respondents stated that in having themselves involved in political affairs, there are other variables that they have to consider, like having trust in themselves to make a stand together with the possession of knowledge, which is essential for them to justify their point and opinions, and sense of commitment in doing so as it will be the holding point for them to continuously move forward with their agenda.

The barriers being accumulated were in terms of age, danger, and insufficient knowledge and time allotted for this matter. It is evident that youth were afraid of the risk when they speak up.

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## Modernized Tradition: Transformation of Public Transport

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**Abstract:** Due to incrementing environmental issues, the Philippine government has aimed solutions for sustainable development by pursuing the Public Utility Vehicle Modernization Program (PUVMP), which was launched in 2017 and took effect in 2020. The program included the modernization of jeepneys, which is a historical icon in the country. The modernization of jeepneys affected jeepney drivers, operators, and commuters alike; thus it is crucial to take their opinions into consideration. In this study, the researchers ought to know the thoughts and opinions of jeepney drivers and commuters concerning the PUVMP in Baguio City. The study that was executed embraced a phenomenological approach. Due to the pandemic the world is facing at present, the responses were gathered using an online survey as it was seen to be fit for the current situation. The results exhibited divided opinions towards the program as drivers and operators were against it, while commuters supported the program. The jeepney drivers and operators used their financial status as a basis for their opinion, while commuters prioritized their safety and comfort. When asked how will they cope with the PUVMP, jeepney drivers showcased a negative array of choices. Their answers varied from complying just because it is what the government wants, opting for illegal schemes to earn money, to losing their jobs completely. The results acquired can be used as a basis for adjustments and changes to produce an ameliorated program which satisfies the needs and wants of the affected groups.

**Key Words:** Modernization; Jeepney; Drivers and Operators; Commuters; PUVMP

### 1. INTRODUCTION

#### 1.1. Background of the Study

Since the 1940s, jeepneys have been a huge part of the daily life of Filipinos, transporting local and non-local commuters to certain locations. It's not a stretch to say that their daily routines depend largely on public transportation. Not only are jeepneys a mode of transportation, it has become a historical symbol and is also one of the famous public transport here in the Philippines aside from tricycles and kalesa which are only in certain places. Jeepneys aren't usually seen anywhere else; that is why it strikes amusement and serves as an experience for first-timers. It also serves as a canvas showcasing arts because of the unique and delightful designs each jeep has. Jeepneys were made available to the Filipinos by the end of World War II. Nonetheless, the jeepneys back then didn't look exactly like the jeepneys we see today. The traditional jeepney was recycled from galvanized or stainless steel. They had fabric covers instead of side windows and longitudinally mounted benches with room for 20 or more (Meiners, 2016). The Filipinos then modified the jeep's appearance and size to accommodate more passengers. Adornments such as the signboard, the route, and colorful strips of plastic attached to the front sides of the jeep make it more

vibrant and known in the streets. In addition, jeepneys are the most affordable and budget-friendly kind of transportation, with fares starting at 7 to 8 pesos.

Although jeepneys are a major part of Philippine history, due to concerns regarding their contribution to the pollution in the environment, harsh restrictions and regulations are being implemented. Traditional models of jeepneys have violated multiple rules, which include overloading and pollution. These violations prove to be risky as these have contributed to health hazards, and by phasing out the traditional jeepneys, violations such as the ones aforementioned could be greatly reduced (Cudis, 2019). With the trial runs done by the government, the general public is ready to accept the revamped jeepneys as they agree that it'll be better for the people and the environment in the long run (Cudis, 2019).

As the Philippine government is aiming for more sustainable development to counter the environmental issues caused by vehicles, the Philippine government and DOTr issued Department Order No. 2017-011 (Re: Omnibus Guidelines on the Planning and Identification of Public Transportation Services and Franchise Issuance) or the Public Utility Vehicle Modernization Program (PUVMP), which was launched back in 2017 (LTFRB, 2017). Popioco and Morales (2017) further explain that the program



aimed to alter the country's public transportation systems to become more efficient and environmentally friendly by replacing old jeepneys with jeepneys that have a Euro-4 compliant engine or an electric engine that lessens the contribution of the said vehicle to the pollution present in the environment. As of May 2020, the LTFRB and DTI have presented 16 prototype jeepneys that were locally manufactured based on the guidelines set by the DOTr. These replacement jeepneys were set to substitute jeepneys that were 15 years or older, hence affecting drivers and operators who have been serving the industry for the longest time (Nano, 2017).

Alongside the PUVMP's budget of ₱2.2 billion (Cabuenas, 2017), The Land Bank of the Philippines estimated that each replacement jeepney will cost around ₱1.2 to ₱1.8 million (Popioco & Morales, 2017); thus, the PUVMP has been criticized as "anti-poor" (Philstar, 2017). Despite the criticism towards the program, multiple government agencies, transport groups (DOTr, 2017), and international partners (Abadilla, 2017) have expressed their support towards the program.

As estimated by Westerman (2018), the number of jeepneys in the country is around 180,000-270,000. With how commuters depend on these public transportations, drivers largely depend on their vehicles as well. Though commuters have a great deal regarding the fare they pay, Westerman (2018) states that jeepney drivers usually earn an average of 700 pesos every two days, but that amount is uncertain as jeepney drivers face certain setbacks that lessen the amount they make. Guss and Tuason (2012) add that certain setbacks include work-related problems that hinder the ability and time to transport passengers, which, in result, lessens the amount these road masters make. Furthermore, the money they spend on maintenance and gas is dependent on their income. As explained by Manuel (2019), the amount jeepney drivers gain in their livelihood is sometimes not even enough to provide for their families; thus, if the PUVMP is fully implemented and the jeepney drivers take out loans to pay for the replacement jeepneys, the additional debt will deprive them of their basic necessities. Manuel (2019) adds, with the number of jeepneys in the country and the hefty price operators and drivers will be paying for the replacement jeepneys, the greatest concern these road masters have is their livelihood as they are afraid that the hefty cost of the replacement jeepneys will leave them with nothing but debt and loss of their livelihood, making their already difficult lives even more difficult.

Due to the hefty estimated price of each replacement jeepney, the Development Bank of the Philippines (DBP) signed a Memorandum of Understanding (MOU) with DOTr to provide aid

through the DBP PASADA Financing Program, which will help cooperatives financially under terms, conditions, and requirements that the operators should comply to. In addition, DOTr also signed an MOU with the Land Bank of the Philippines for ₱1 billion under the Special Environment-Friendly and Efficient Driven (SPEED) Jeepney Program for the financial assistance of individual drivers (Newman, 2017). To further ease the financial concerns of operators and drivers, DOTr and LTFRB will be providing financing schemes, which include an easy downpayment, very low interest rates, payability in seven years, and an ₱80,000 government subsidy, to be able to pay for a replacement jeepney (Mercurio, 2019).

However, no matter how ready the affected communities already are, it is prime to note that the PUVMP will bring about a drastic change; thus the phase-out shouldn't be immediate as the general public, jeepney drivers, and operators need time to get used to the new and modernized jeepneys. As the government failed to phase out traditional jeepneys by June 2020, as of March 2021, the program has been constantly improved to conform to the needs of the affected communities by including more benefits, which include monthly salaries, SSS, PhilHealth, and a separate profit from the cooperative (Mercurio, 2020).

### *1.2. Problems of the Study*

As stated, commuters have a positive perception towards the modernization plan and jeepney drivers are against it due to the hefty price they will be paying. In this paper, the researchers aim to see if the positive perception of the commuters is indeed true, and on the other end, the researchers aim to gather responses from jeepney drivers to see if they have already thought of coping mechanisms once the program is fully implemented.

To be able to gather the data required, the researchers have generated two questions, one for commuters and one for jeepney drivers.

How do local commuters in the City of Baguio perceive the government's jeepney modernization plan?

How do the local drivers plan to cope with this jeepney modernization program?

Depending on the answers given by the respondents, the researchers were able to identify specific problems the program generated and ways such could still be developed and enhanced.

## **2. METHODOLOGY**

### *2.1. Research Design*



The researchers embossed a phenomenological approach in this study. As stated by Creswell (2013), phenomenology is an approach to qualitative research that focuses on the commonality of a lived experience within a particular group. The fundamental goal of the approach is to arrive at a description of the nature of the particular phenomenon. The researchers' strategy was based on either their own or individual experiences and sensory perceptions. Utilizing qualitative conception, the researchers were able to frame the driver's and commuter's thoughts on the jeepney modernization plan.

### 2.2. Sampling Method

In this study, the researchers concluded that these two sampling methods were suitable for gathering respondents: simple random sampling and snowball sampling. Simple random sampling was used to find and collect data from commuters in Baguio City to get equal and unbiased responses as it was easy to find respondents willing to participate in the study. Simple random sampling is a method wherein the respondents are purely chosen by chance (Shantikumar, 2018).

The sampling method used to get data from jeepney drivers in Baguio City was the snowball sampling method. The researchers discussed the difficulty of collecting responses from the jeepney drivers in Baguio City due to the COVID-19 pandemic hindering access to jeepney associations and cooperatives; therefore, this non-random sampling method was used to help encourage other participants to take part in the study. As stated by Breweton and Millward (2001), snowball sampling is a sampling method wherein respondents encourage other possible respondents to participate in the study.

### 2.3. Population and Locale of the Study

The study respondents were nine jeepney drivers and nine commuters from Baguio City with social media accounts. The researchers chose commuter respondents from different fields and had different experiences with the traditional jeepneys. The nine jeepney drivers were drivers who traveled the Baguio Plaza - Holy Ghost route.

### 2.4. Data Gathering Instruments

Due to the COVID-19 pandemic, an online survey became the most practical data collection tool, where a set of questions were sent out to a target sample to respond to the questions (Bhat, ND).

### 2.5. Data Analysis

For the data analysis, the researchers used thematic analysis as their method of analyzing the

data. The answers given by respondents were categorized into codes that corresponded to master themes. Thematic analysis, as defined by The University of Auckland (nd), is an analysis method that focuses on identifying patterns in the answers of the respondents.

## 3. RESULTS AND DISCUSSION

**Table 1.** Master Themes from Commuter Respondents Regarding Perception on the Government's Jeepney Modernization Plan

| Master Themes       | Corresponding Codes | Exemplar Quotes  |
|---------------------|---------------------|--|
| Positive Perception | Modern Jeepneys     | "To upgrade the old jeepneys into much safer and more environment-friendly ones."                            |
|                     | Safe                | "Maganda ito para sa mga commuters at sa mga driver dahil para din ito sa safety ng lahat."                  |
|                     | Brilliant           | "My thoughts on the jeepney modernization plan is a good plan."  |
|                     | Spacious            | "While it's great that our jeepneys would become eco-friendly and spacious in the future"                    |
| Negative Perception | Culture Loss        | "Sadly, the touch of our culture would be lost, and I think that would be a shame to the future generation." |

As established in Table 1, the key commuter informants positively favor the government's jeepney modernization plan. As quoted by some of the respondents, "My thoughts on the jeepney modernization plan is a good plan," and "While it's great that our jeepneys would become eco friendly and spacious in the future." Based on the test run of modern jeepneys conducted by Hino, the public seemed to favor the government's PUVMP as it proved to be much safer and comfortable compared to traditional jeepneys.

**Table 2.** Master Themes from Commuter Respondents Regarding the Benefits of the Government's Jeepney Modernization Plan

| Master Themes         | Corresponding Codes | Exemplar Quotes  |
|-----------------------|---------------------|--|
| Positive Expectations | Safe                | "As a commuter, I will feel safer knowing that the drivers will be using new jeeps instead of the old ones." |
|                       | Comfortable         | "It will also be convenient and comfortable for me since it will be more advanced."                          |
|                       | Convenient          | "Can lead me faster to my destination"   |
|                       | Cheaper Fees        | "Lesser commuter fee"  |
|                       | Less Pollution      | "Less polluted environment caused by the old jeepneys"   |

As shown in Table 2, the key commuter informants expect benefits from the government's PUVMP as they look forward to the comfort and safety the modernized PUJs will bring. As quoted by one respondent, "As a commuter, I will feel safer knowing that the drivers will be using new jeeps instead of the old ones. It will also be convenient and comfortable for me since it will be more advanced." Cudis (2019) claims that by phasing out the traditional jeepneys, violations such as health hazards could be reduced as



the PUVMP's purpose is to replace old jeepneys with much safer, eco-friendly, and comfortable units.

**Table 3.** Master Themes from Driver Respondents Regarding Perception on the Government's Jeepney Modernization Plan

| Master Themes       | Corresponding Codes | Exemplar Quotes                                      |
|---------------------|---------------------|--|
| Negative Perception | Change              | " <i>Papalitan ng bago modelo ang mga jeepney.</i> " |

|  |               |  |
|--|---------------|--|
|  | More Research | "To do more research about it"               |
|  | Expensive     | " <i>Papalitan ng napakamahal na jeep</i> "  |
|  | Not Needed    | " <i>Para sa akin ndi na kailangan ito</i> " |

Unlike the positive perception from commuters, the key jeepney driver informants showcased negative perception towards the PUVMP. Table 3 showcases the jeepney drivers complaining mainly about the change of jeepneys and the cost they have to pay. Drivers also stated that the PUVMP is not needed.

**Table 4.** Master Themes from Driver Respondents Regarding Experiences Related to the Government's Jeepney Modernization Plan

| Master Themes        | Corresponding Codes         | Exemplar Quotes   |
|----------------------|-----------------------------|---|
| Negative Experiences | Burden                      | " <i>Maraming driver ang mawawalan ng trabaho pag dating ng jeepney modernization. Dahil hindi kayang bumili ng mga operator ang binebenta ng mga gobyerno na worth 2.4 million payable in 7 years.</i> " |
|                      | Pollutant                   | " <i>mausok na sasakyan</i> "   |
| No Experiences       | No experience               | "None"<br>" <i>Wala pa</i> "  |
|                      | Needs further understanding | "Need to understand more."  |

Table 4 exhibits that key jeepney driver informants have negative experiences with the PUVMP. As quoted by one respondent, "*Maraming driver ang mawawalan ng trabaho pag dating ng jeepney modernization dahil hindi kayang bumili ng mga operator ang binebenta ng mga gobyerno na worth 2.4 million payable in 7 years. (Lots of drivers will lose their jobs because they are unable to pay the cost of the replacement.)*" As said by Manuel (2019), operators and drivers are afraid they won't have enough financial support to afford a replacement unit.

**Table 5.** Master Themes from Driver Respondents Regarding their Coping Ways if the Jeepney Modernization Plan will be Implemented

| Master Themes | Corresponding Codes | Exemplar Quotes   |
|---------------|---------------------|---|
| Resignation   | Cooperation         | " <i>Walang magagawa kung ipapatupad ang modernisasyon dahil gobyerno mismo ang may gusto.</i> "<br>" <i>I will cooperate as long as the modernization process is good.</i> " |

|        |                |  |
|--------|----------------|--|
|        | Colorum scheme | "I'll go with colorum scheme as I cannot allow to put on hold my own franchise."   |
| Denial | Hard time      | " <i>Mahihirapan.</i> "  |
|        | Cannot cope    | " <i>Hindi kakayanin yan ng ordinaryong operator. Kasi ang boundary ng jeep hindi akma sa buwanang hulog ng sasakyan</i> " |
|        | Expensive      | "I cannot pay the cost of modern jeepneys."  |
|        | No Jobs        | " <i>Wala na pong trabaho.</i> "   |

As showcased in Table 5, the key jeepney driver informants are clearly torn between coping and not coping. As noted by 1 respondent, some jeepney drivers including himself will be going with the colorum scheme, which is an illegal public transport scheme, as they cannot afford the replacement units and putting their franchise on hold. Although, another jeepney driver stated, "*Walang magagawa kung ipapatupad ang modernisasyon dahil gobyerno mismo ang may gusto. (We can't do anything else as it is what the government wants.)*" This shows the lack of choices drivers have. If they won't comply, they will not be able to earn a living. Another respondent expressed concern about the financial crisis operators could be facing because of the implementation. He noted, "*Hindi kakayanin yan ng ordinaryong operator kasi ang boundary ng jeep hindi akma sa buwanang hulog ng sasakyan. (Ordinary operators can't afford it as the monthly income they get isn't enough.)*" According to Manuel (2019), the income of drivers and operators will not be enough to pay for the price of a new unit. Furthermore, if drivers and operators do afford a unit by taking out loans, they would be spending all their income to pay off their debts.

**Table 6.** Master Themes from Driver Respondents Regarding Suggestions to make the Government's Jeepney Modernization Plan Better

| Master Themes  | Corresponding Codes | Exemplar Quotes   |
|----------------|---------------------|---|
| Modern Upgrade | Recondition         | " <i>Makakabuti sa lahat kung upgrading sana sa mga jeepney, papagandahin at aausin nalang sana at palitan nalang ng bagong makina keysa bibili pa ng napakamahal nilang inaalok na modernized jeepney.</i> "<br>" <i>Strict implementation of motor vehicle inspection especially smoke emission as not all old jeepneys with euro2 engines are bad smokers. Mine as I always maintain my jeep can have a smoke emission lower than modern cars.</i> " |
| Status quo     | Discontinue         | "No to modernization."  |

Table 6 exhibits the suggestions drivers have that can be used to improve the current bill. One respondent stated, "*Makakabuti sa lahat kung upgrading sana sa mga jeepney, papagandahin at aausin nalang sana at palitan nalang ng bagong makina keysa bibili pa ng napakamahal nilang inaalok na modernized jeepney. (It will be better if the jeepneys will only be upgraded and fixed instead of buying the expensive modernized jeepneys.)*" Another



respondent also expressed that “Strict implementation of motor vehicle inspection especially smoke emission as not all old jeepneys with euro2 engines are bad smokers. Mine as I always maintain my jeep can have a smoke emission lower than modern cars.” In summary, drivers suggested the discontinuation of the PUVMP, and a simple upgrading and regular inspection of old units can do the work.

#### 4. CONCLUSIONS

After conducting surveys on both commuters and jeepney drivers, the respondents have provided their insights on the problems aforementioned.

The viewpoints from each group of respondents opposed each other as most of the commuters responded positively towards the jeepney modernization program, unlike the jeepney drivers, due to the fact that it is more environmentally friendly and would reduce accidents due to the mechanical failure of old jeepneys.

Jeepney drivers showcased varied answers when asked for their coping mechanisms once the PUVMP is fully implemented. Some drivers decided to just cooperate as it is what the government wants, while others would just opt for illegal methods like the colorum scheme. While some of the drivers came up with coping mechanisms, the other half of the respondents stated that they would not be able to cope, thus losing their jobs as jeepney drivers.

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