



CASE STUDY FOR DESCRIPTIVE STATISTICS

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Publisher

Ipmi Press

Case Study for Descriptive Statistics

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Published by

Ipni Press
Ipni International Business School
Jl. Rawajati Timur I No.1, RT.3/RW.2, Rawajati, Kec. Pancoran, Kota Jakarta Selatan, Daerah Khusus Ibukota Jakarta 12750 Gedung Ipni Jakarta Selatan
Telp.021-7978888
Publisher@ipni.ac.id

ISBN: 978-623-09-2937-3
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PREFACE

This book is designed and developed in support of the Business Statistic course. It provides compilation of descriptive statistics using SPSS statistical software for different case studies.

The module consists of 10 case study with the topics are: asia & europe unemployment rate from 2018-2020, entertainment industry, stock performance of lq45 index from 2017-2021, an analysis of the effect of online game to the teenager, the pandemic effect on the sub-saharan africa international tourism, by the number of arrivals and receipts (current US\$) in 2018-2020 lip product in indonesia, data analysis of automotive sales from 2011-2017 in indonesia, public property & real estate companies stock price in times of the covid-19 pandemic in indonesia (2020-2021), and the global purchase of playstation 5.

Hopefully, this book can be used widely as the complementary guideline in the Business Statistic course and facilitate the learning process resulting in student's improvement.

October, 2022.

Dety Nurfadilah, MBA., IFP & Yulita F. Susanti PhD

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CASE STUDY 1.

ASIA & EUROPE UNEMPLOYMENT RATE FROM 2018-2020

1. Motivation

1.1 Background

The welfare of a nation is paramount to supporting the activities of its citizens in terms of education, health, and other activities. The more prosperous a country is, the more qualified its citizens will be. On the other hand, when the country is not yet prosperous, the citizens can feel many negative things. One of the indicators to measure a nation and its citizens is already prosperous. It can be seen through the unemployment rate of that country. When the unemployment rate is low, we will see that the citizens are more facilitated. On the other hand, when the unemployment rate is high, many things can happen, such as increased crime rates, etc.

We do this because we want to know whether people in Asian and European countries are already prosperous or not through the unemployment rate indicator. This means that the lower the unemployment rate, the more prosperous the citizens and their country will be, and vice versa, the higher the unemployment rate, the less prosperous the citizens and the country will be.

For this reason, we would like to analyze several countries in Asia and Europe to find out the majority of unemployment rates owned by those countries, based on their income level group data (Low income, lower middle income, upper middle income, high income), country group data (developing and developed country), the unemployment rate data from 2018 until 2020.

1.2 Objective

1. To identify the type of data provided
2. To analyze the prosperity level in Asian and European countries.

3. To analyze the qualitative data related to country group and income level group
4. To analyze the quantitative data related to unemployment rate from 2018-to 2020
5. To analyze the data using a bar chart, pie chart, histogram, and boxplot

1.3 Question

1. What is the type of data provided?
2. Whether citizens in Asian and European countries are already prosperous or not?
3. How to define the qualitative data related to country group and income level group?
4. How to define the quantitative data related to unemployment rate from 2018 to 2020?
5. How to define the data using a bar chart, pie chart, histogram, and boxplot?

2. Method

2.1 Data

All the data that is provided in this report were collected from secondary data. The data regarding the Income group and the unemployment rate from 2018 to 2020 were taken from the World Data Bank website. And for the country group, was taken from the Wikipedia website.

2.2 Sampling

The raw data and population of our research are based on a total of 91 countries in Asia and Europe. The sampling frame of our research is as follows:

Table 1. List of Sampling Frame

Country Name	Country Group	Income Group	2018	2019	2020
Afghanistan	Developing	Low income	11.15	11.22	11.71
Albania	Developing	Upper middle income	12.30	11.47	13.33
Armenia	Developing	Upper middle income	18.97	18.30	21.21
Austria	Developed	High income	4.85	4.49	5.36
Azerbaijan	Developing	Upper middle income	4.90	4.85	6.46
Belgium	Developed	High income	5.95	5.36	5.55
Bangladesh	Developing	Lower middle income	4.41	4.44	5.41
Bulgaria	Developing	Upper middle income	5.21	4.23	5.12
Bosnia and Herzegovina	Developing	Upper middle income	18.40	15.69	15.27
Belarus	Developing	Upper middle income	4.76	4.16	4.77
Brunei Darussalam	Developed	High income	8.70	6.92	7.68
Bahrain	Developing	High income	1.20	1.20	1.78
Bhutan	Developed	Lower middle income	2.44	2.50	3.65
Switzerland	Developed	High income	4.71	4.39	4.82

China	Developing	Upper middle income	4.28	4.52	5.00
Cyprus	Developed	High income	8.37	7.07	7.59
Czech Republic	Developed	High income	2.24	2.01	2.55
Germany	Developed	High income	3.38	3.14	3.81
Denmark	Developed	High income	5.13	5.02	5.64
Egypt, Arab Rep.	Developing	Lower middle income	9.82	7.84	9.17
Spain	Developed	High income	15.25	14.10	15.53
Estonia	Developed	High income	5.37	4.45	6.80
Finland	Developed	High income	7.36	6.69	7.76
France	Developed	High income	9.02	8.41	8.01
United Kingdom	Developed	High income	4.00	3.74	4.47
Georgia	Developed	Upper middle income	12.67	11.57	18.50
Greece	Developed	High income	19.29	17.31	16.30
Hong Kong SAR, China	Developed	High income	2.82	2.93	5.83
Croatia	Developed	High income	8.43	6.62	7.51
Hungary	Developing	High income	3.71	3.42	4.25
Indonesia	Developing	Lower middle income	4.40	3.62	4.28
India	Developing	Lower middle income	5.33	5.27	8.00
Ireland	Developed	High income	5.74	4.95	5.62
Iran, Islamic Rep.	Developed	Lower middle income	12.19	10.74	12.17
Iraq	Developing	Upper middle income	12.97	12.86	14.09
Iceland	Developed	High income	2.70	3.51	5.48
Israel	Developed	High income	4.00	3.80	4.33
Italy	Developed	High income	10.61	9.95	9.16
Jordan	Developing	Upper middle income	18.27	16.81	19.03
Japan	Developed	High income	2.40	2.40	2.80
Kazakhstan	Developing	Upper middle income	4.85	4.80	4.89
Kyrgyz Republic	Developed	Lower middle income	6.89	6.92	8.71
Cambodia	Developed	Lower middle income	0.14	0.15	0.33
Korea, Rep.	Developed	High income	3.82	3.75	3.93
Lao PDR	Developing	Lower middle income	0.83	0.85	1.03
Lebanon	Developing	Upper middle income	10.80	11.35	13.30
Sri Lanka	Developing	Lower middle income	4.32	4.35	5.88
Lithuania	Developed	High income	6.15	6.26	8.49
Luxembourg	Developed	High income	5.59	5.59	6.77
Latvia	Developed	High income	7.41	6.31	8.10
Mongolia	Developed	Lower middle income	5.38	5.44	7.01
Morocco	Developed	Lower middle income	9.27	9.28	11.45
Moldova	Developing	Upper middle income	4.11	5.10	3.82
Maldives	Developing	Upper middle income	5.62	5.34	6.33
North Macedonia	Developing	Upper middle income	20.74	17.26	17.20
Malta	Developed	High income	3.66	3.62	4.26
Myanmar	Developed	Lower middle income	0.87	0.50	1.06
Montenegro	Developing	Upper middle income	15.17	15.12	17.90
Macao SAR, China	Developed	High income	1.83	1.75	2.57
Malaysia	Developing	Upper middle income	3.30	3.26	4.50
Netherlands	Developed	High income	3.83	3.38	3.82

Norway	Developed	High income	3.80	3.69	4.42
Nepal	Developing	Lower middle income	3.19	3.10	4.72
Oman	Developed	High income	1.80	1.85	2.94
Pakistan	Developing	Lower middle income	4.08	3.54	4.30
Philippines	Developing	Lower middle income	2.34	2.24	2.52
Poland	Developing	High income	3.85	3.28	3.16
Korea, Dem. People's Rep.	Developed	Low income	2.63	2.59	2.92
Portugal	Developed	High income	6.99	6.46	6.79
Paraguay	Developing	Upper middle income	6.22	6.59	7.55
Qatar	Developing	High income	0.11	0.10	0.21
Romania	Developing	Upper middle income	4.19	3.91	5.03
Russian Federation	Developing	Upper middle income	4.85	4.50	5.59
Saudi Arabia	Developing	High income	6.04	5.67	7.45
Singapore	Developed	High income	3.64	3.10	4.10
Serbia	Developing	Upper middle income	12.73	10.39	9.01
Slovak Republic	Developed	High income	6.54	5.75	6.69
Slovenia	Developed	High income	5.11	4.45	4.97
Sweden	Developed	High income	6.36	6.83	8.29
Syrian Arab Republic	Developing	Low income	8.76	8.77	10.26
Thailand	Developing	Upper middle income	0.77	0.72	1.10
Tajikistan	Developing	Lower middle income	7.01	7.06	7.58
Turkmenistan	Developing	Upper middle income	4.23	4.27	4.95
Timor-Leste	Developed	Lower middle income	4.73	4.51	4.91
Tunisia	Developing	Lower middle income	15.46	15.13	16.59
Turkey	Developed	Upper middle income	10.89	13.67	13.11
Ukraine	Developing	Lower middle income	8.80	8.19	9.13
Uzbekistan	Developing	Lower middle income	5.84	5.85	7.04
Vietnam	Developing	Lower middle income	1.16	2.04	2.39
United Arab Emirates	Developing	High income	2.35	2.23	3.19
Yemen, Rep.	Developed	Low income	13.15	13.06	13.39

For the sampling technique, we chose to use a **random sampling technique** to collect the data for our sample. By picking all of the data randomly using a roulette wheel, that represents the population. After that, we came up with a sample of 50 countries from 91 countries in Asia and Europe. In addition, the confidence interval of our report is 95%.

Country Name	Country Group	Income Group	Rate 2018	Rate 2019	Rate 2020
Afghanistan	Developing	Low income	11.15	11.22	11.71
Albania	Developing	Upper middle income	12.30	11.47	13.33
United Arab Emirates	Developing	High income	2.35	2.23	3.19
Armenia	Developing	Upper middle income	18.97	18.30	21.21
Belgium	Developed	High income	5.95	5.36	5.55
Bangladesh	Developing	Lower middle income	4.41	4.44	5.41
Bulgaria	Developing	Upper middle income	5.21	4.23	5.12
Bahrain	Developing	High income	1.20	1.20	1.78
Brunei Darussalam	Developed	High income	8.70	6.92	7.68

Switzerland	Developed	High income	4.71	4.39	4.82
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Croatia	Developed	High income	8.43	6.62	7.51
Indonesia	Developing	Lower middle income	4.40	3.62	4.28
India	Developing	Lower middle income	5.33	5.27	8.00
Ireland	Developed	High income	5.74	4.95	5.62
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Myanmar	Developed	Lower middle income	0.87	0.50	1.06
Montenegro	Developing	Upper middle income	15.17	15.12	17.90
Mongolia	Developed	Lower middle income	5.38	5.44	7.01
Malaysia	Developing	Upper middle income	3.30	3.26	4.50
Netherlands	Developed	High income	3.83	3.38	3.82
Norway	Developed	High income	3.80	3.69	4.42
Nepal	Developing	Lower middle income	3.19	3.10	4.72
Pakistan	Developing	Lower middle income	4.08	3.54	4.30
Philippines	Developing	Lower middle income	2.34	2.24	2.52
Portugal	Developed	High income	6.99	6.46	6.79
Paraguay	Developing	Upper middle income	6.22	6.59	7.55
Qatar	Developing	High income	0.11	0.10	0.21
Romania	Developing	Upper middle income	4.19	3.91	5.03
Singapore	Developed	High income	3.64	3.10	4.10
Serbia	Developing	Upper middle income	12.73	10.39	9.01
Thailand	Developing	Upper middle income	0.77	0.72	1.10
Turkey	Developed	Upper middle income	10.89	13.67	13.11
Uzbekistan	Developing	Lower middle income	5.84	5.85	7.04
Vietnam	Developing	Lower middle income	1.16	2.04	2.39
Yemen, Rep.	Developed	Low income	13.15	13.06	13.39
Belarus	Developing	Upper Middle Income	4.76	4.16	4.77
Cyprus	Developed	High Income	8.37	7.07	7.59

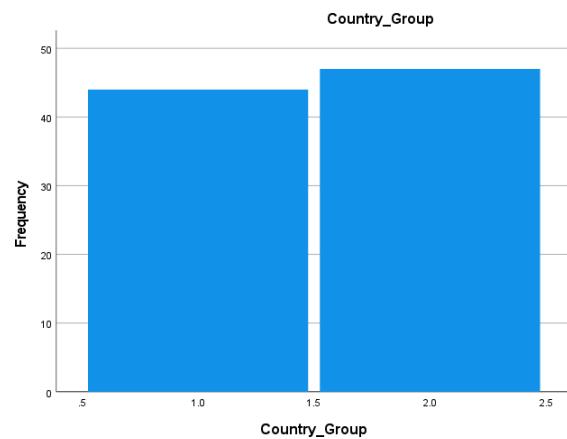
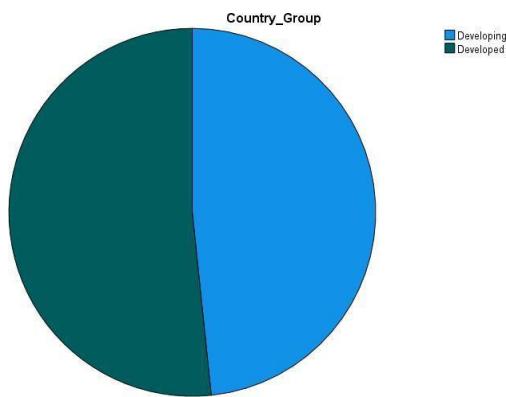
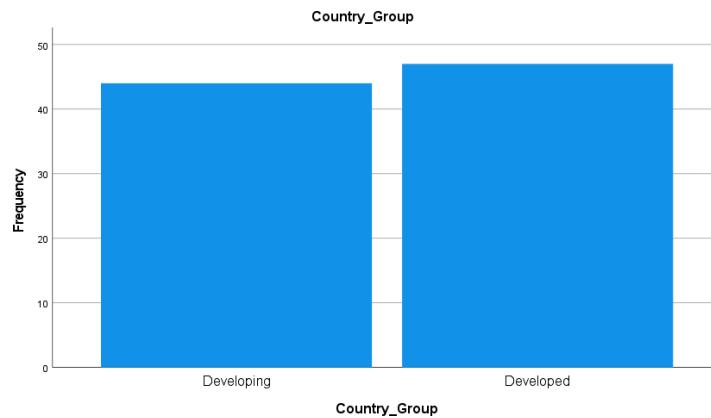
3. Mechanics

3.1 Qualitative data

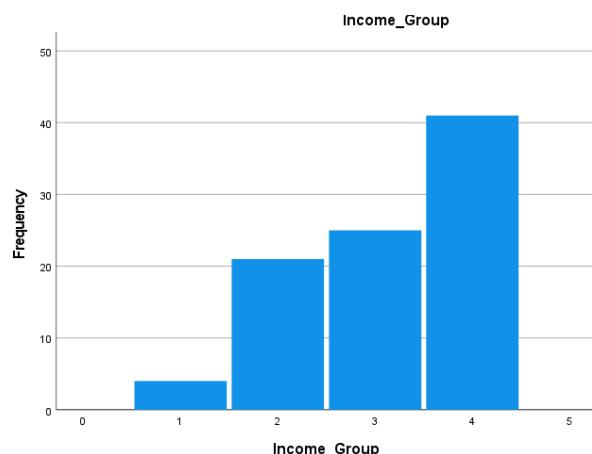
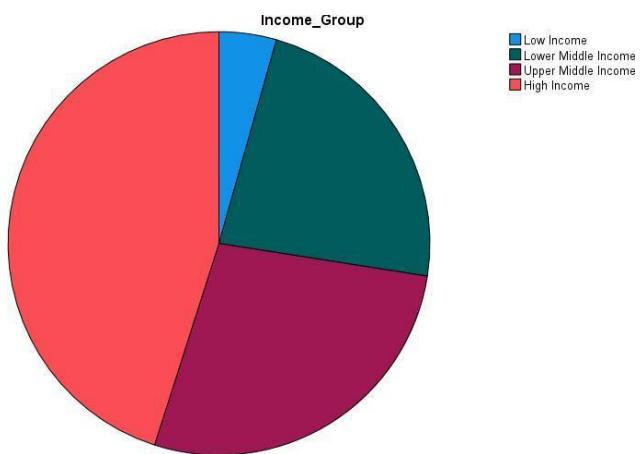
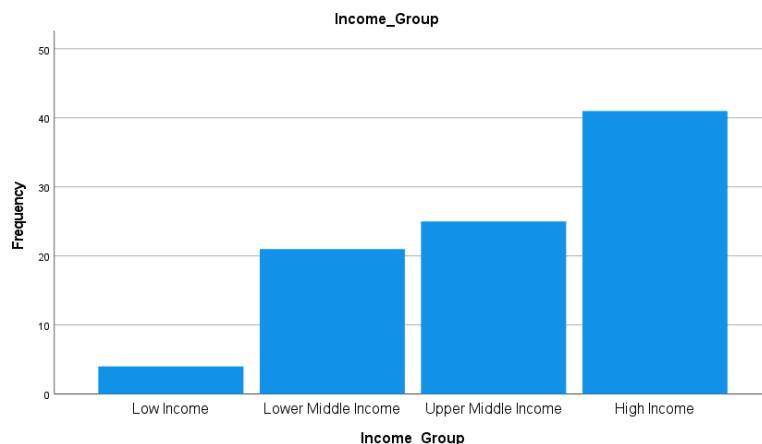
In doing this report, we used Country Group and Income Group as our qualitative data. The level of measurement of those data is nominal and ordinal.

- **Frequency table (Population)**

Country_Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Developing	44	48.4	48.4	48.4
	Developed	47	51.6	51.6	100.0
	Total	91	100.0	100.0	



Income_Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low Income	4	4.4	4.4	4.4
	Lower Middle Income	21	23.1	23.1	27.5
	Upper Middle Income	25	27.5	27.5	54.9
	High Income	41	45.1	45.1	100.0
	Total	91	100.0	100.0	

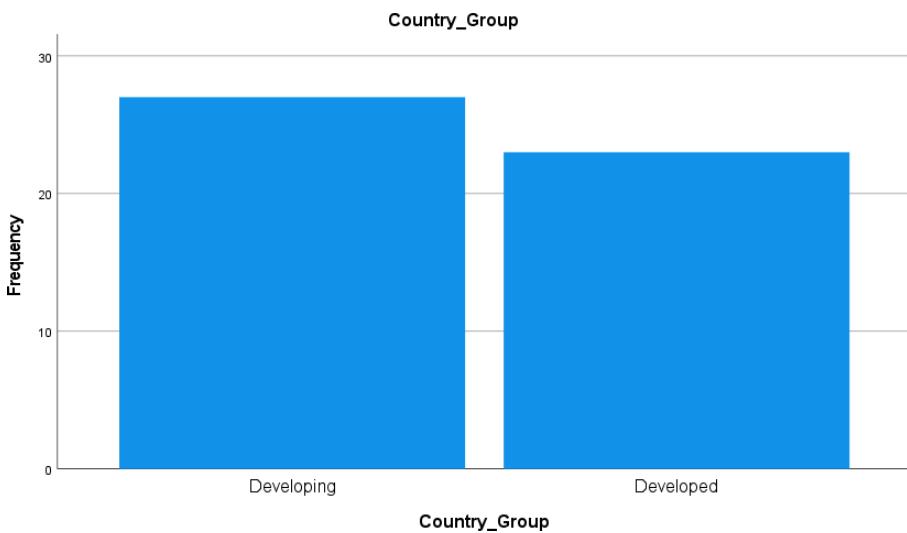


From the data that can be seen above. There are two categories in the frequency table: the country group and the income group. From the category of country group, the highest frequency in population is developed country, which is 47 countries with the percentage of 51,6%. And for the income group the highest frequency is high income, which is 41 countries with the percentage of 45.1%.

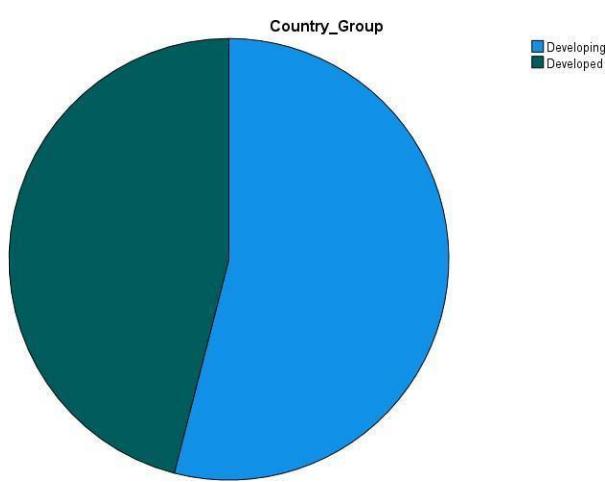
● Frequency Table (Sample)

Country_Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Developing	27	54.0	54.0	54.0
	Developed	23	46.0	46.0	100.0
	Total	50	100.0	100.0	

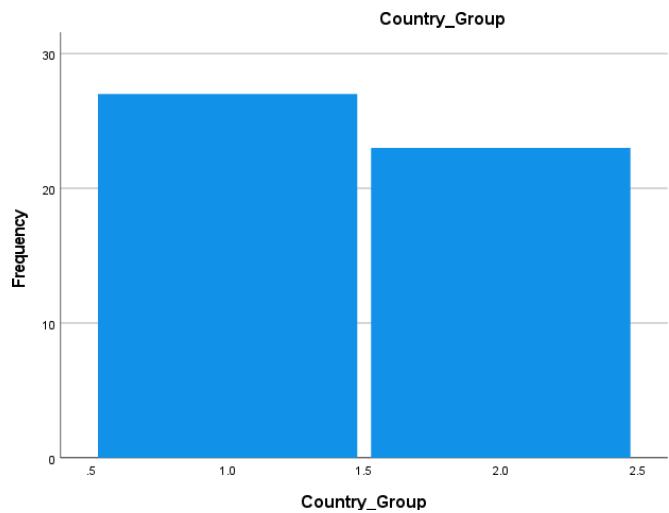
BAR CHART



Pie Chart

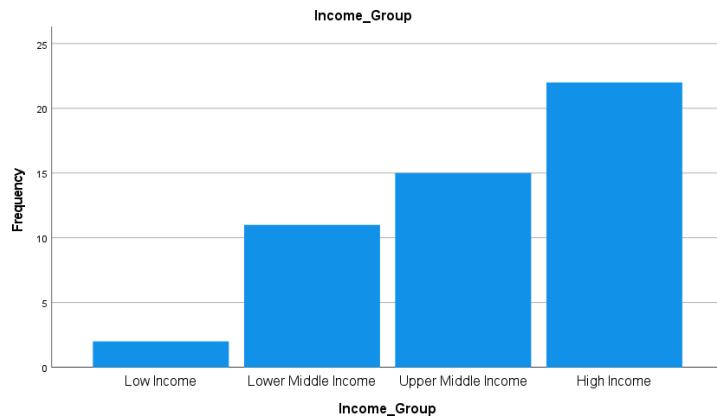
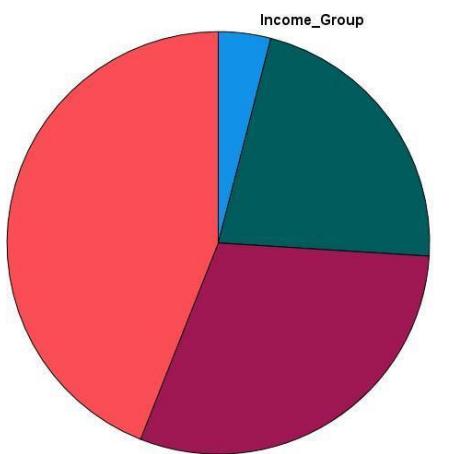
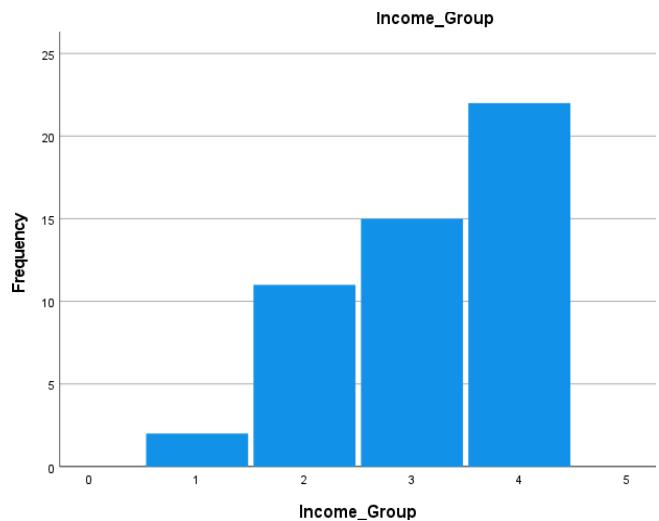


Histogram



Income_Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low Income	2	4.0	4.0	4.0
	Lower Middle Income	11	22.0	22.0	26.0
	Upper Middle Income	15	30.0	30.0	56.0
	High Income	22	44.0	44.0	100.0
	Total	50	100.0	100.0	

Bar Chart**Pie Chart****Histogram**

Same as the population from the data that can be seen above. There are two categories in the frequency table: the country group and the income group. From the category of country group, the highest frequency in the sample is developing country, which is 27 countries with the percentage of 54%. And for the income group the highest frequency is high income, which is 22 countries with the percentage 44%

3.2 Quantitative data

The quantitative data that we used is the unemployment rate of the countries in Asia and Europe from 2018 to 2020. We use the scale method for calculating the quantitative data in SPSS. With the values:

1 = 0 - 5%

2 = >5% - 10%

3 = >10% - 15%

4 = Above 15%

- **Statistic (Population)**

Statistics			
	Rate_2018	Rate_2019	Rate_2020
N	91	91	91
Valid			
Missing	0	0	0
Mode	1	1	2
Percentiles	25 50 75	1.00 2.00 2.00	1.00 2.00 2.00

Descriptives			
		Statistic	Std. Error
Rate_2018	Mean	1.81	.100
	95% Confidence Interval for Mean	Lower Bound Upper Bound	1.61 2.01
	5% Trimmed Mean	1.74	
	Median	2.00	
	Variance	.909	
	Std. Deviation	.953	
	Minimum	1	
	Maximum	4	
	Range	3	
	Interquartile Range	1	
	Skewness	1.015	.253
	Kurtosis	.082	.500
Rate_2019	Mean	1.74	.099
	95% Confidence Interval for Mean	Lower Bound Upper Bound	1.54 1.93
	5% Trimmed Mean	1.65	
	Median	1.00	
	Variance	.885	
	Std. Deviation	.941	
	Minimum	1	
	Maximum	4	
	Range	3	
	Interquartile Range	1	
	Skewness	1.128	.253
	Kurtosis	.286	.500
Rate_2020	Mean	1.93	.097
	95% Confidence Interval for Mean	Lower Bound Upper Bound	1.74 2.13
	5% Trimmed Mean	1.87	
	Median	2.00	
	Variance	.862	
	Std. Deviation	.929	
	Minimum	1	
	Maximum	4	
	Range	3	
	Interquartile Range	1	
	Skewness	.899	.253
	Kurtosis	.103	.500

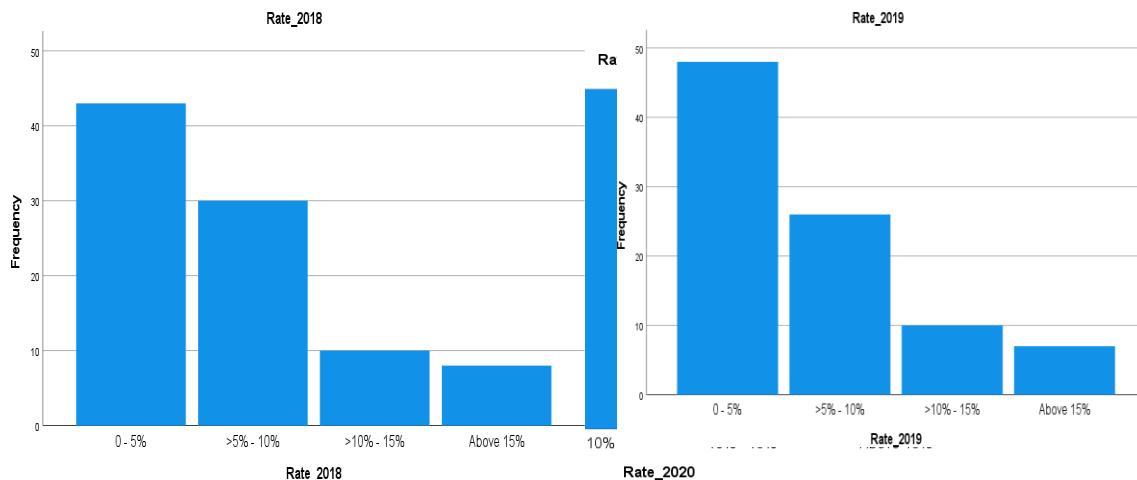
From the population data above:

In 2018 The first quartile is 1, the third quartile is 2, and the interquartile is 1. It is also the same in 2019 and 2020. Regarding the mean, median, mode, variance, and standard deviation. For 2018, the mean is 1.81 which is close to 2 (indicates that the average of the unemployment rate is in the range of >5% - 10%), the mode is 1 (indicates that most countries have an unemployment rate in the range of 0 - 5%), and the median is 2 (indicates that the midpoint within those countries is in the range of >5 - 10%). The variance of the population data is 0.909 and the standard deviation is 0.953.

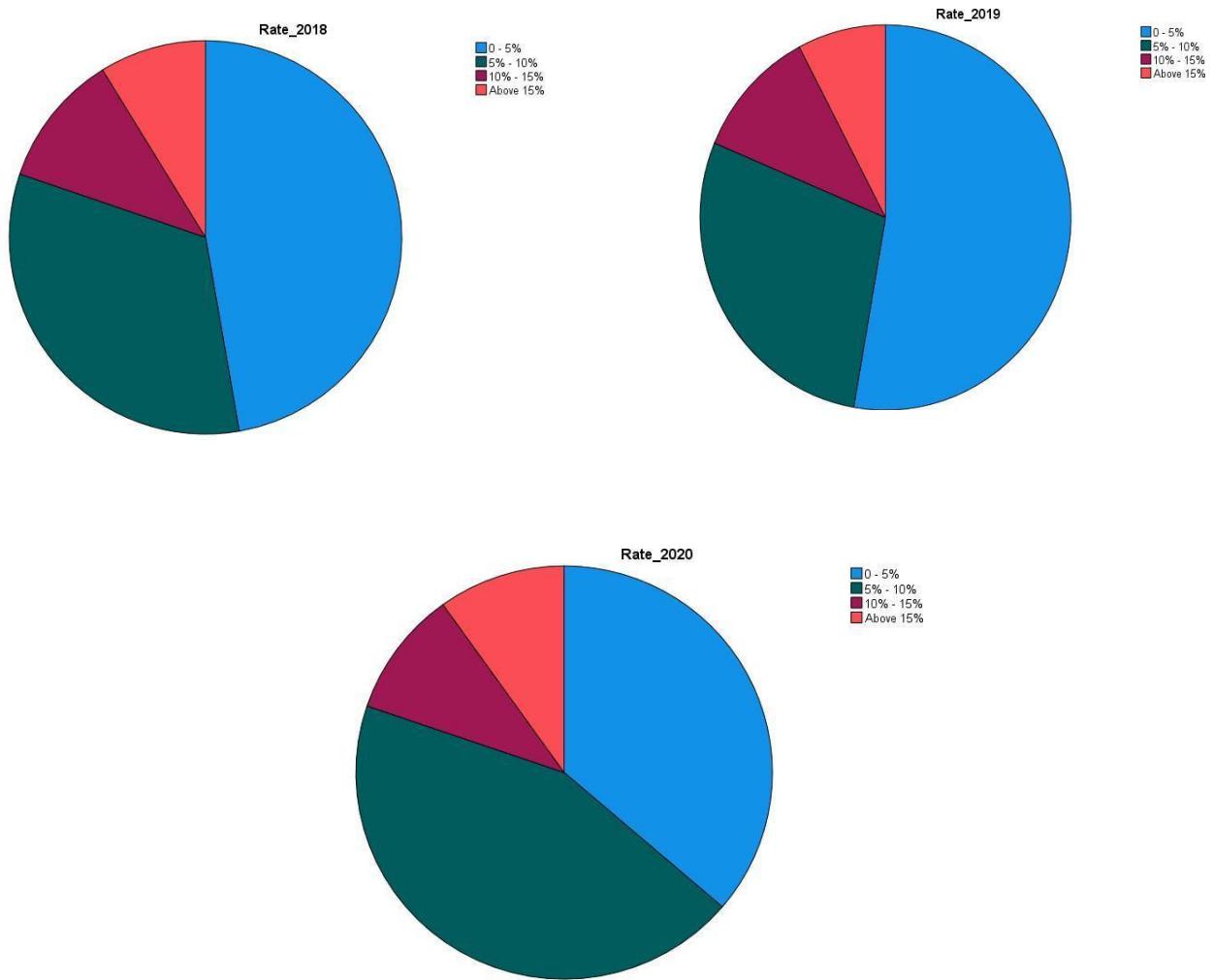
For 2019, the mean is 1.74 which is close to 2 (indicates that the average of the unemployment rate is in the range of >5% - 10%), the mode is 1 (indicates that most countries have an unemployment rate in the range of 0 - 5%), and the median is 1 (indicates that the midpoint within those countries is in the range of 0 - 5%). The variance of the population data is 0.885 and the standard deviation is 0.941.

For 2020, the mean is 1.93 which is close to 2 (indicates that the average of the unemployment rate is in the range of >5% - 10%), the mode is 2 (indicates that most countries have an unemployment rate in the range of >5 - 10%), and the median is 2 (indicates that the midpoint within those countries is in the range of >5 - 10%). The variance of the population data is 0.862 and the standard deviation is 0.929.

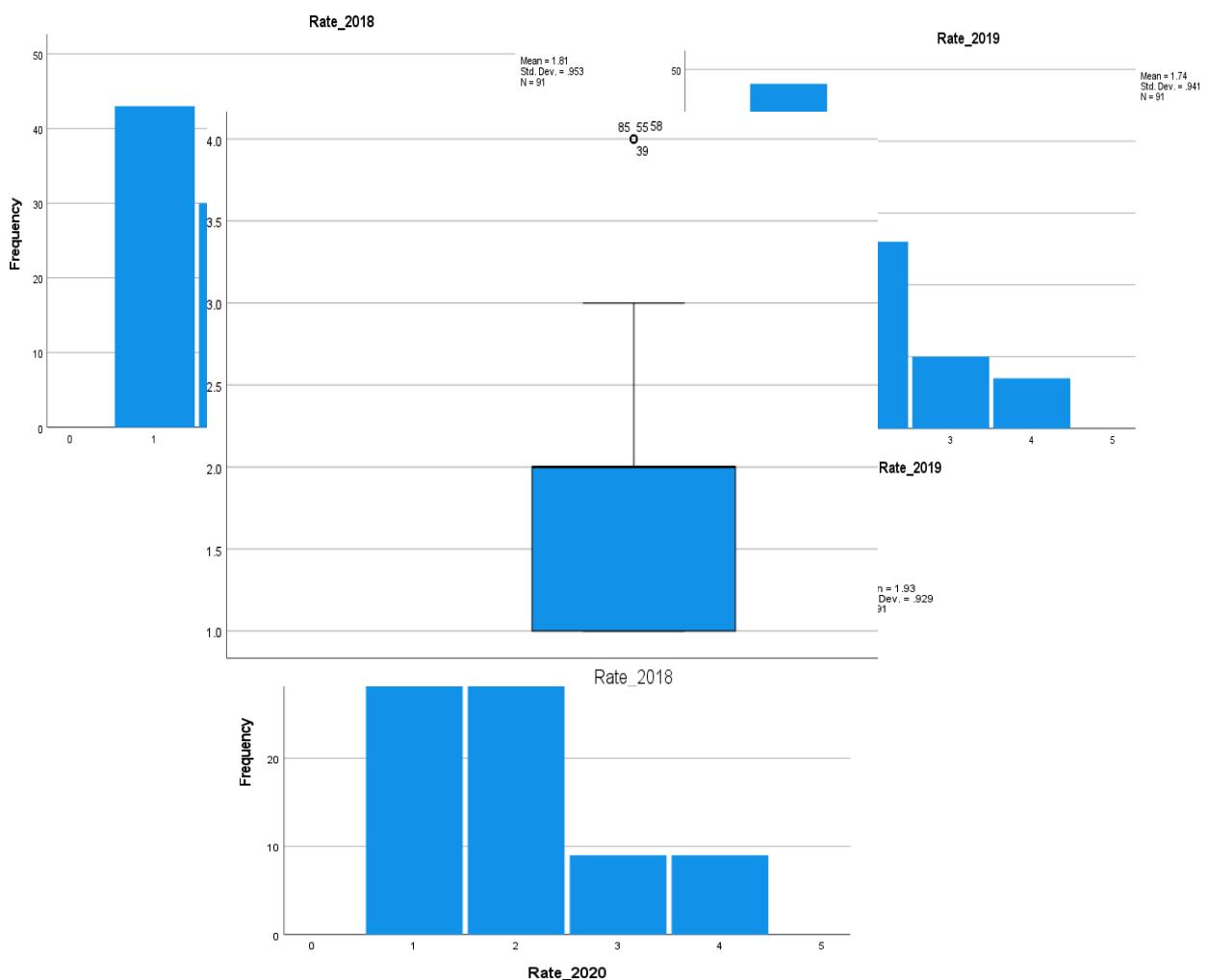
- **Bar Chart of Unemployment Rate 2018 - 2020 (Population)**



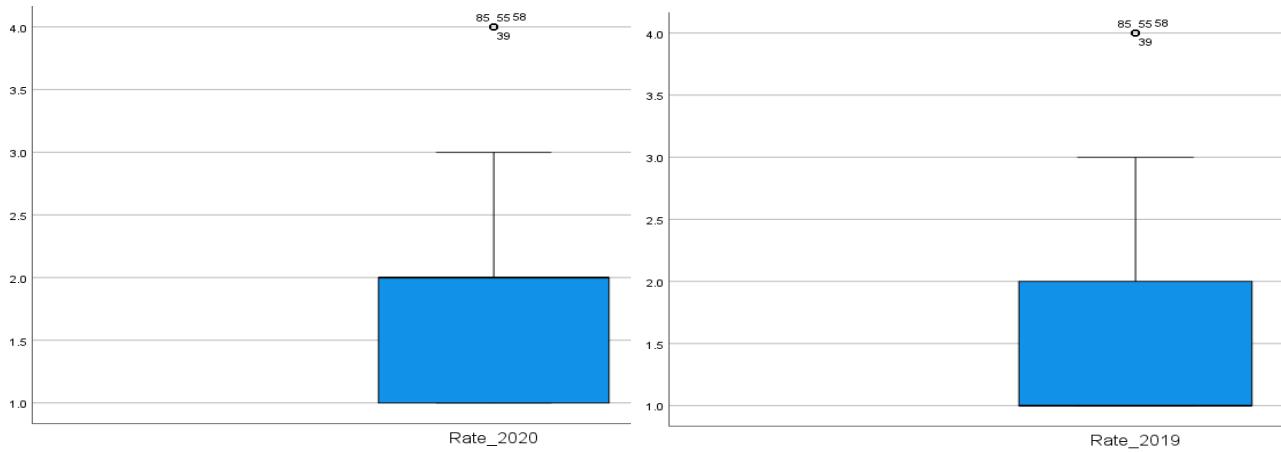
- **Pie Chart of Unemployment Rate 2018 - 2020 (Population)**



- **Histogram of Unemployment Rate 2018 - 2020 (Population)**



- **Boxplot of Unemployment Rate 2018 - 2020 (Population)**



As we can see from the boxplots above, those three figures show the same shape. Also, those three figures have the same outliers, which is in the number 4. In addition, from the boxplot we can see that the majority of the distributions are in numbers 1 to 2.

• Statistic (Sample)

Statistics					
		Scale of Unemployment Rate in 2018	Scale of Unemployment Rate in 2019	Scale of Unemployment Rate in 2020	
N	Valid	50	50	50	
	Missing	0	0	0	Descriptives
Descriptives					
				Statistic	Std. Error
Unemployment Rate in 2018		Mean		1.76	.130
		95% Confidence Interval for Mean		1.50	
		Lower Bound		1.50	
		Upper Bound		2.02	
		5% Trimmed Mean		1.68	
		Median		1.50	
		Variance		.839	
		Std. Deviation		.916	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		1.004	.337
		Kurtosis		.098	.662
Unemployment Rate in 2019		Mean		1.68	.123
		95% Confidence Interval for Mean		1.43	
		Lower Bound		1.43	
		Upper Bound		1.93	
		5% Trimmed Mean		1.60	
		Median		1.00	
		Variance		.753	
		Std. Deviation		.868	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		1.076	.337
		Kurtosis		.273	.662

Unemployment Rate in 2020	Mean	1.78	.122
	95% Confidence Interval for Mean	Lower Bound	1.53
		Upper Bound	2.03
	5% Trimmed Mean		1.70
	Median		2.00
	Variance		.747
	Std. Deviation		.864
	Minimum		1
	Maximum		4
	Range		3
	Interquartile Range		1
	Skewness	1.044	.337
	Kurtosis	.621	.662

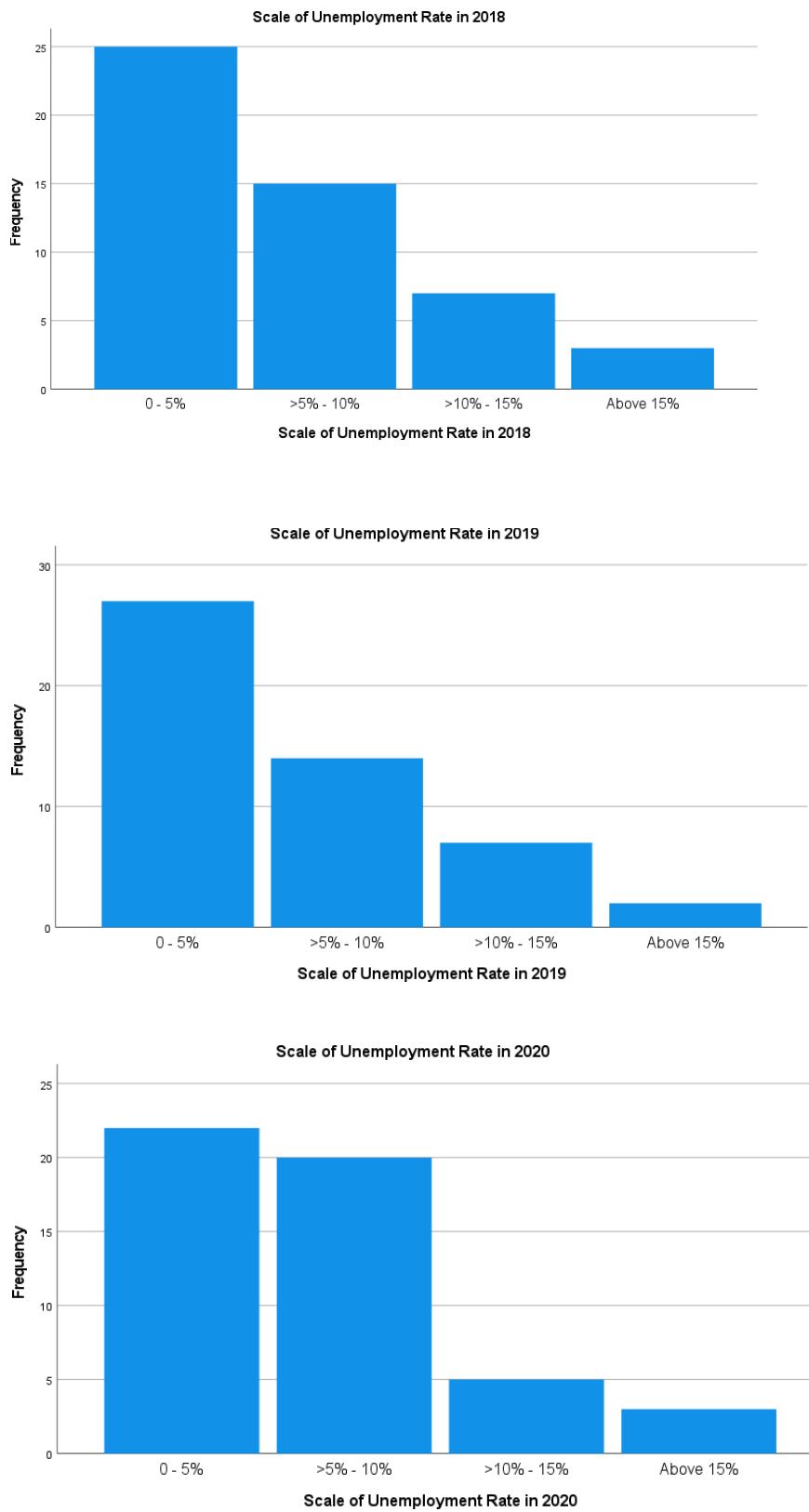
From the sample data, in 2018, the first quartile is 1, the third quartile is 2, and the interquartile is 1. The data is also the same in 2019 and 2020.

Regarding the mean, median, mode, variance, and standard deviation. For 2018, the mean is 1.76 (which means the average of the unemployment rate is in the range of >5% - 10%, since it is close to 2), the mode is 1 (indicates that most countries have an unemployment rate in the range of 0 - 5%), and the median is 1,50 (indicates that the midpoint within those countries is in the range of >5% - 10% because close to level 2). The variance of the sample data is 0.839 and the standard deviation is 0.916.

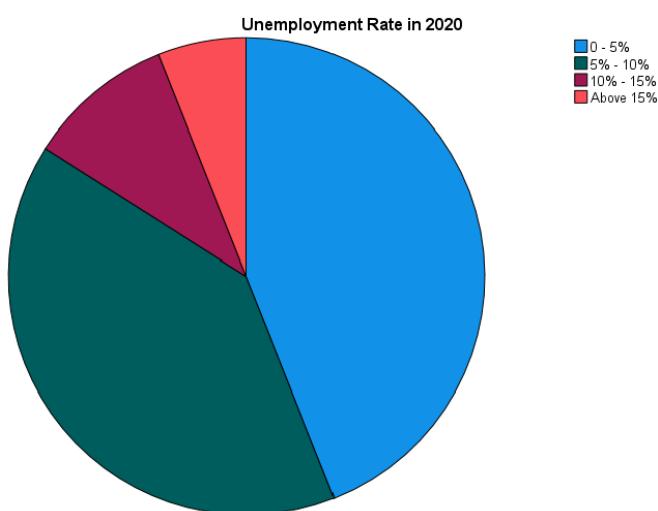
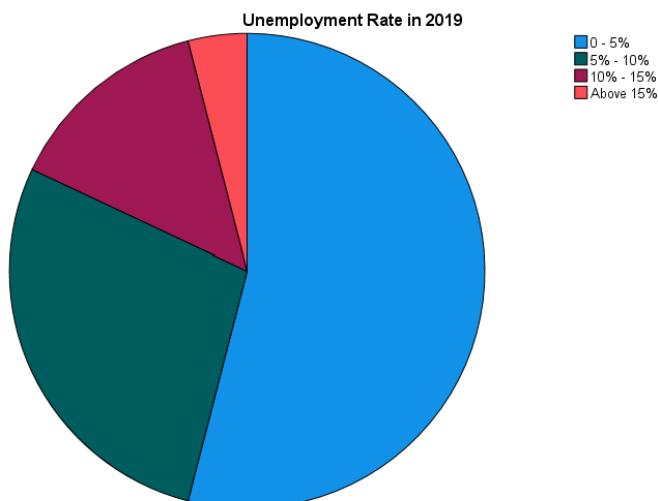
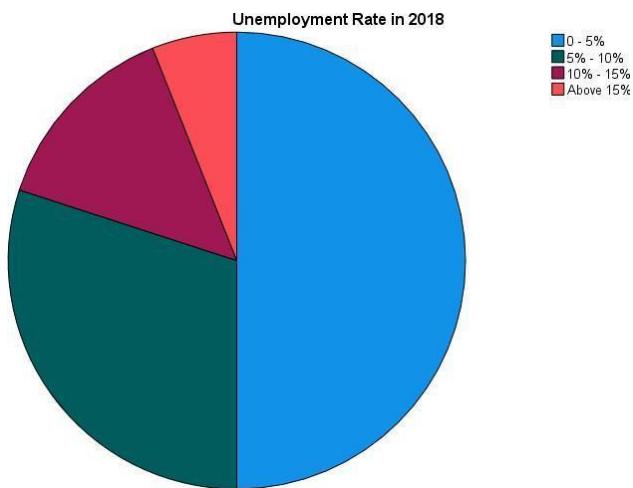
For 2019, the mean is 1.68 (indicates that the average of the unemployment rate is in the range of >5% - 10%, since it is close to 2), the mode is 1 (indicates that most countries have an unemployment rate in the range of 0 - 5%), and the median is 1 (indicates that the midpoint within those countries is in the range of 0 - 5%). The variance of the population data is 0.753 and the standard deviation is 0.868.

For 2020, the mean is 1.78 (indicates that the average of the unemployment rate is in the range of >5% - 10%, since it is close to 2), the mode is 1 (indicates that most countries have an unemployment rate in the range of 0 - 5%), and the median is 2 (indicates that the midpoint within those countries is in the range of >5 - 10%). The variance of the population data is 0.747 and the standard deviation is 0.864.

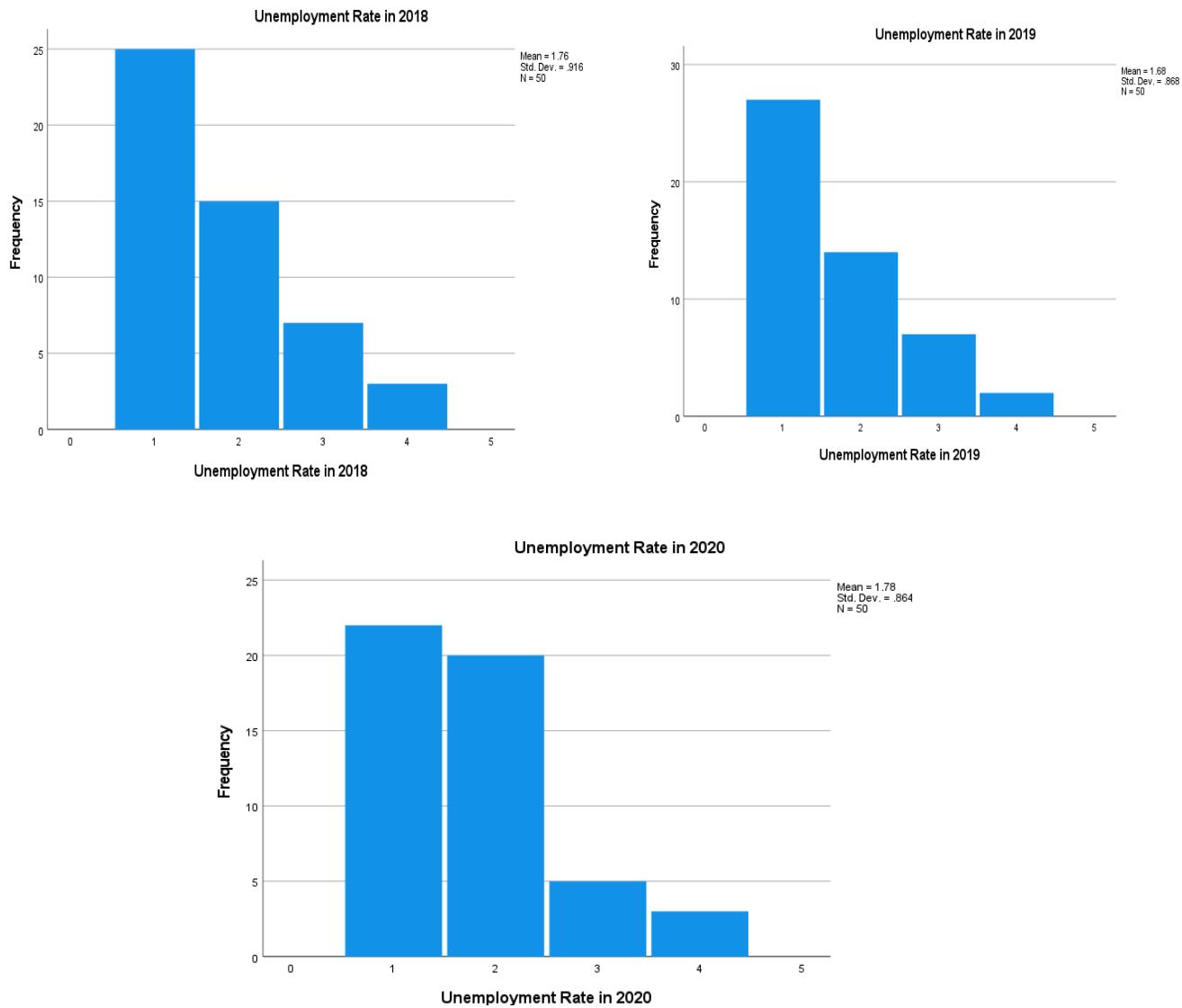
- **Bar Chart of Unemployment Rate 2018 - 2020 (Sample)**



- **Pie Chart of Unemployment Rate 2018 - 2020 (Sample)**

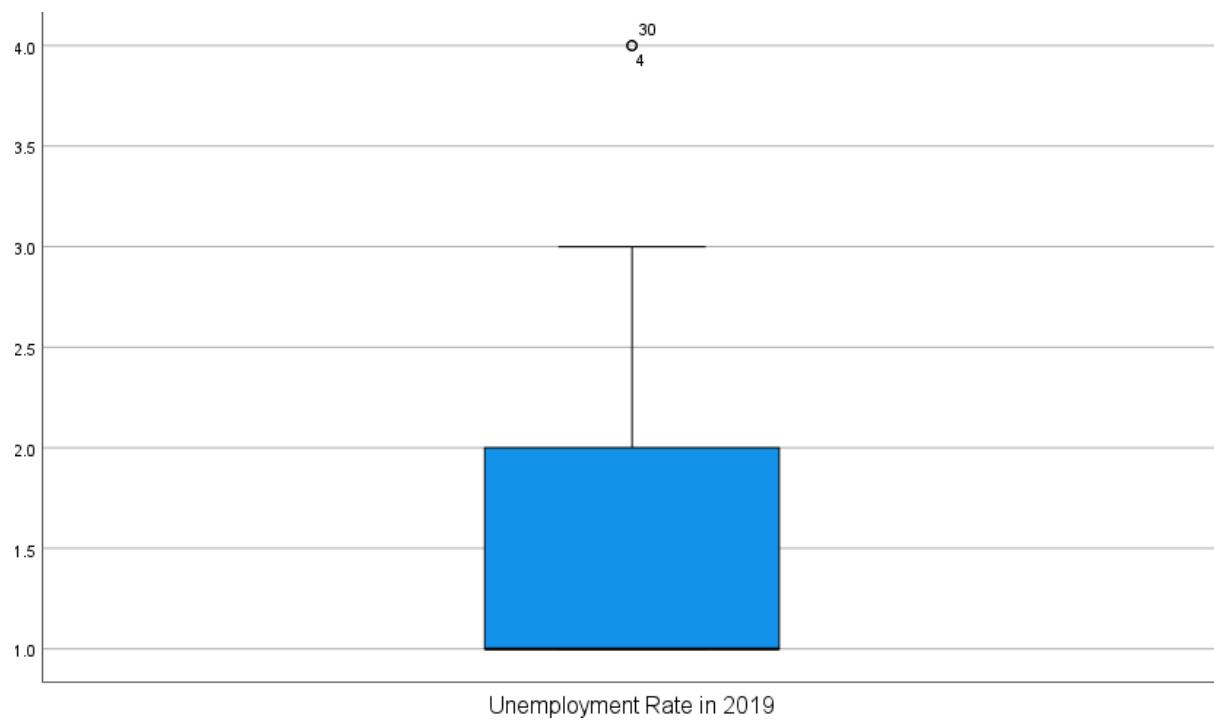
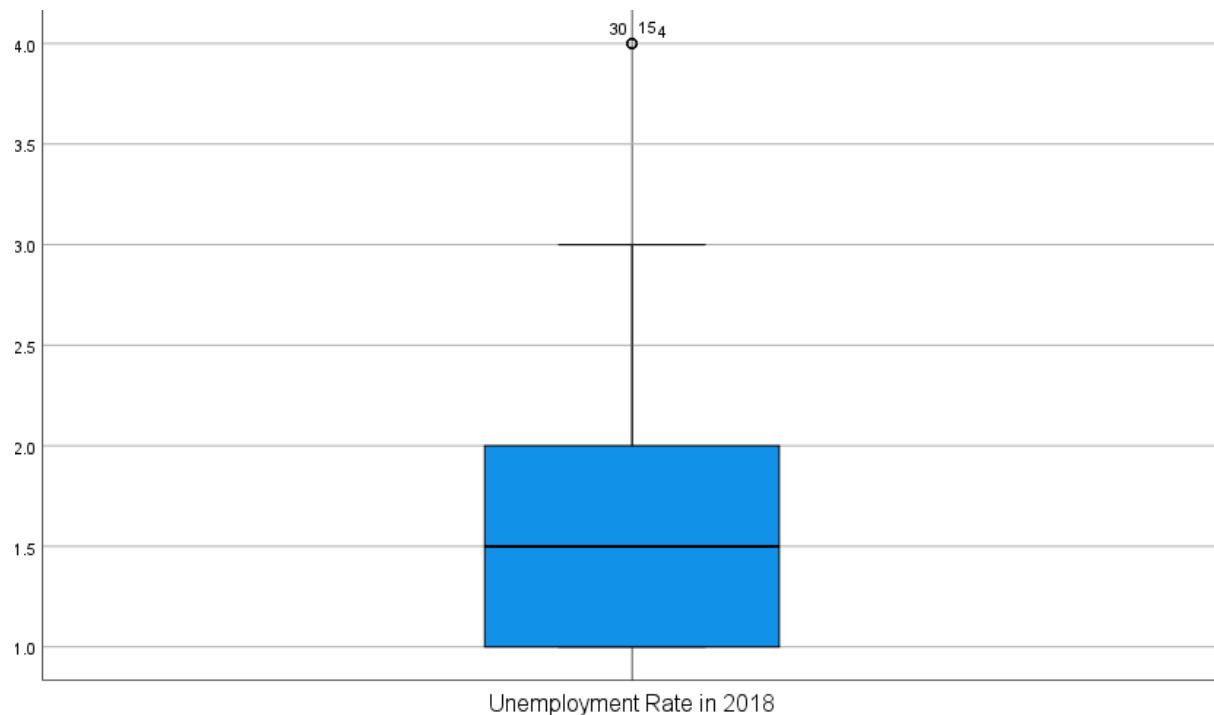


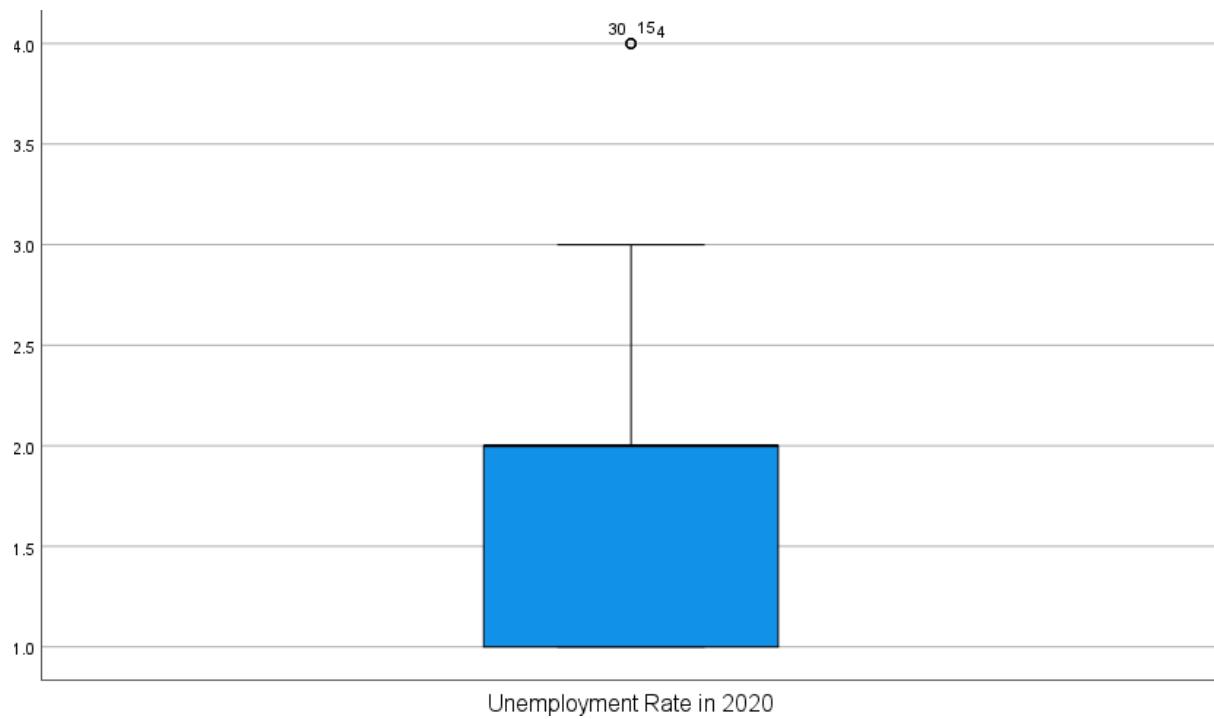
● Histogram of Unemployment Rate 2018 - 2020 (Sample)



From the Bar chart and Histogram above, in 2018, most countries have an unemployment rate between 0-5% on the scale or number 1. Same as the previous year, in 2019 most countries in Asia and Europe have an unemployment rate between 0-5% on scale or number 1. Different from the population, in the sample data, most countries still have an unemployment rate in the range of 0 - 5% for 2020.

● Boxplot of Unemployment Rate 2018 - 2020 (Sample)





As we can see from the boxplots above, those three figures show the same shape. Also, those three figures have the same outliers, which is in the number 4. In addition, from the boxplot we can see that the majority of the distributions are in numbers 1 to 2.

3. Message

In conclusion, most of the citizens who live in Asian and European countries can be classified as prosperous enough. It can be seen from the sample data that we took, the unemployment rate in 2018, 2019, and 2020 is below 5%. From the data that has been analyzed as well, we can conclude that most countries in Asia and Europe are in the category of developing countries and have high income levels. The chart, histogram, and the boxplot can also be used to perform further analysis regarding the gaps that exist in those countries.

References

1. *Unemployment, total (% of total labor force) (modeled ILO estimate) / Data.* (n.d.). World Bank Data. Retrieved April 10, 2022, from <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS>
2. Wikipedia.com

CASE STUDY 2.

DATA ANALYSIS OF VEGETABLES PRODUCTION IN 7 PROVINCE FROM 2019-2020

1. Motivation

1.1 Background

In this 21st century, Agriculture is one major source of food in every human life. Humans invented agriculture between 7,000 and 10,000 years ago, during the Neolithic era, or the New Stone Age. There were eight Neolithic crops: emmer wheat, einkorn wheat, peas, lentils, bitter vetch, hulled barley, chickpeas, and flax. The Neolithic era ended with the development of metal tools. Since then, agriculture had experienced a lot of revolutions or transformations in regard to its way of production and how it could be sustained. The main 3 agricultural revolutions are, The First Agricultural Revolution was the transition from hunting and gathering to planting and sustaining. The Second Agricultural Revolution increased the productivity of farming through mechanization and access to market areas due to better transportation. The Third Agricultural Revolution is commercial farming where products of farming are for sale, usually done in more developed countries, and requires use of machinery.

Nowadays, vegetable plantation is very significant to our life as it complements our dish in daily life. Based on our data, we learned that each year the demand for vegetables increases in society. This is because people are getting more aware about their health and in our era a community called vegetarian has become a trend that has a considerable number of populations. They have a new ideology that animals mustn't be slaughtered, and we should all rely to eat plants instead of meats that may raise the risk of heart disease because they contain saturated fatty acids, which can increase low-density lipoprotein, or bad cholesterol, which is known to put people at greater risk of heart problems as well as many type of cancer such as colon cancer, prostate cancer, breast cancer, lymphoma, and

stomach cancer. Although this is not entirely true because the consumption of protein is beneficial of our health if we can maintain good quality of meat and consume it in ideal manner.

Overall, this is an interesting topic to be discussed about and we would like to analyze the production of vegetable in Indonesia for each province based on type of vegetables, year of production, and total production in order to find which type of vegetables that has the highest demand for each province in Indonesia also to see which year is the pinnacle and the minimum of vegetables plantation in our country.

1.2 Objectives

1. To identify the type of data provided.
2. To analyze which type of vegetable that has the lowest frequency for contributing to Indonesia's vegetable total production based on population and sampling.
3. To analyze the quantitative data related to the number of productions.
4. To analyze the qualitative data related to the type of vegetables and the province they were produced.
5. To analyze the data using a bar chart or pie chart, boxplot, and histogram.

1.3 Question

1. What is the type of data provided?
2. Which type of vegetable has the lowest frequency for contributing to Indonesia's vegetable total production based on population and sampling?
3. How to define the quantitative data related to the number of productions?
4. How to define the qualitative data related to the type of vegetables and the province they were produced?
5. How to define the data using a bar chart or pie chart, boxplot, and histogram?

2. Method

2.1 Data

To conduct this research, all the data are taken from secondary resources. Total production of all agricultural products came from the website Badan Pusat Statistik. For the data production of each agricultural product from 7 big provinces in Indonesia, we analyze it based on total production of one from 2 years of data.

2.2 Sampling

The raw data and population of our research are based on the total of 84 data from 7 provinces and 6 types of product in each province. The sampling frame of our research are as follows:

Table 1. List of Sampling Frame

Cauliflower	North Sumatera	2019	53278
Cauliflower	West Sumatera		15917
Cauliflower	South Sumatera		124
Cauliflower	Lampung		299
Cauliflower	West Java		26108
Cauliflower	Central Java		43680
Cauliflower	East Java		22653
Mustard	North Sumatera	2019	78728
Mustard	West Sumatera		35994
Mustard	South Sumatera		4141
Mustard	Lampung		9095

Mustard	West Java		179925
Mustard	Central Java		98325
Mustard	East Java		74395
Carrot	North Sumatera	2019	95821
Carrot	West Sumatera		41078
Carrot	South Sumatera		3669
Carrot	Lampung		6155
Carrot	West Java		155312
Carrot	Central Java		160278
Carrot	East Java		91012
Long Beans	North Sumatera	2019	29313
Long Beans	West Sumatera		20822
Long Beans	South Sumatera		9755
Long Beans	Lampung		12465
Long Beans	West Java		80943
Long Beans	Central Java		24311
Long Beans	East Java		45015
Big Chili	North Sumatera	2019	154008
Big Chili	West Sumatera		139994
Big Chili	South Sumatera		40479

Big Chili	Lampung		40101
Big Chili	West Java		263949
Big Chili	Central Java		164906
Big Chili	East Java		104677
Cayenne Pepper	North Sumatera	2019	49246
Cayenne Pepper	West Sumatera		31782
Cayenne Pepper	South Sumatera		11014
Cayenne Pepper	Lampung		12796
Cayenne Pepper	West Java		128494
Cayenne Pepper	Central Java		148750
Cayenne Pepper	East Java		536098
Cauliflower	North Sumatera		57739
Cauliflower	West Sumatera	2020	17760
Cauliflower	South Sumatera		300
Cauliflower	Lampung		298
Cauliflower	West Java		29061
Cauliflower	Central Java		43227
Cauliflower	East Java		32043
Mustard	North Sumatera	2020	75424
Mustard	West Sumatera		33929

Mustard	South Sumatera		4383
Mustard	Lampung		10572
Mustard	West Java		189354
Mustard	Central Java		87597
Mustard	East Java		77716
Carrot	North Sumatera	2020	99306
Carrot	West Sumatera		32197
Carrot	South Sumatera		2156
Carrot	Lampung		6396
Carrot	West Java		152000
Carrot	Central Java		149229
Carrot	East Java		80398
Long Beans	North Sumatera	2020	32189
Long Beans	West Sumatera		19472
Long Beans	South Sumatera		8942
Long Beans	Lampung		13500
Long Beans	West Java		81731
Long Beans	Central Java		23193
Long Beans	East Java		39878
Big Chili	North Sumatera	2020	193862

Big Chili	West Sumatera	2020	133190
Big Chili	South Sumatera		28497
Big Chili	Lampung		37987
Big Chili	West Java		266067
Big Chili	Central Java		166260
Big Chili	East Java		99110
Cayenne Pepper	North Sumatera	2020	61160
Cayenne Pepper	West Sumatera		33356
Cayenne Pepper	South Sumatera		11645
Cayenne Pepper	Lampung		10558
Cayenne Pepper	West Java		130838
Cayenne Pepper	Central Java		159099
Cayenne Pepper	East Java		684943

In this research, we use purposive random sampling technique to collect the data sample by dividing the population into the scale of all production into 3 scale low represent by 1(0-5000 tons),medium represent by 2 (5000-30000 tons),and high represent by 3 (more than 30000). The sampling was chosen using spss tool recorde into same variables, old and new values. From the sampling, we choose thirty one sizes of the sample (Table is shown below).). Afterward, we choose the product based on total production from low to medium production. The confidence interval of our research is 95%

1.	South Sum	Cauliflower	2019	1
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2.	Lampung	Cauliflower	2019	1
3.	South Sum	Mustard	2019	1
4.	South Sum	Carrot	2019	1
5.	South Sum	Cauliflower	2020	1
6.	Lampung	Cauliflower	2020	1
7.	South Sum	Mustard	2020	1
8.	South Sum	Carrot	2020	1
9.	West Sum	Cauliflower	2019	2
10.	West Jav	Cauliflower	2019	2
11.	East Jav	Cauliflower	2019	2
12.	Lampung	Mustard	2019	2
13.	Lampung	Carrot	2019	2
14.	North Sum	Long Bea	2019	2
15.	West Sum	Long Bea	2019	2
16.	South Sum	Long Bea	2019	2
17.	Lampung	Long Bea	2019	2

18.	Central	Long Bea	2019	2
19.	South Sum	Cayenne	2019	2
20.	Lampung	Cayenne	2019	2
21.	West Sum	Cauliflower	2020	2
22.	West Jav	Cauliflower	2020	2
23.	Lampung	Mustard	2020	2
24.	Lampung	Carrot	2020	2
25.	West Sum	Long Bean	2020	2
26.	South Sum	Long Bean	2020	2
27.	Lampung	Long Bean	2020	2
28.	Central	Long Bean	2020	2
29.	South Sum	Big Chil	2020	2
30.	South Sum	Cayenne	2020	2
31.	Lampung	Cayenne	2020	2

3. Mechanics

Do the analysis

3.1 Qualitative data

In researching holticultura of vegetables product for searching which product still have low and medium production for quality development. Nominal data was used in this research whereas nominal data for the province and name of vegetable.

Table 2. Frame Frequency table

Name of vegetable	frequency
cauliflower	9
mustard	4
carrot	4
Long beans	9
Big chili	1
Cayenne paper	4
province	frequency
North sum	1
West sum	4
South sum	11
Lampung	10
West java	2
Central java	2
East java	1

Sampling result

South Su	Cauliflo	2019	1
Lampung	Cauliflo	2019	1
South Su	Mustard	2019	1
South Su	Carrot	2019	1
South Su	Cauliflo	2020	1
Lampung	Cauliflo	2020	1
South Su	Mustard	2020	1
South Su	Carrot	2020	1
West Sum	Cauliflo	2019	2
West Jav	Cauliflo	2019	2
East Jav	Cauliflo	2019	2
Lampung	Mustard	2019	2
Lampung	Carrot	2019	2
North Su	Long Bea	2019	2
West Sum	Long Bea	2019	2
South Su	Long Bea	2019	2
Lampung	Long Bea	2019	2
Central	Long Bea	2019	2
South Su	Cayenne	2019	2
Lampung	Cayenne	2019	2
West Sum	Cauliflo	2020	2
West Jav	Cauliflo	2020	2
Lampung	Mustard	2020	2
Lampung	Carrot	2020	2
West Sum	Long Bea	2020	2
South Su	Long Bea	2020	2
Lampung	Long Bea	2020	2
Central	Long Bea	2020	2
South Su	Big Chil	2020	2
South Su	Cayenne	2020	2
Lampung	Cayenne	2020	2

As the data are shown above. The population's frequency is based on the thirty-one lists of production vegetables product. There are nine cauliflower also long beans, four for mustard also carrot and cayenne pepper, the last is one for big chili. We choose province for nominal data because they are essentials to search which priority area government should improve number of productions first.

3.2 Quantitative data in this research

There is one quantitative variable. They are the number of total productions from every variety of vegetables. This is important for scientific to search and give solution to what

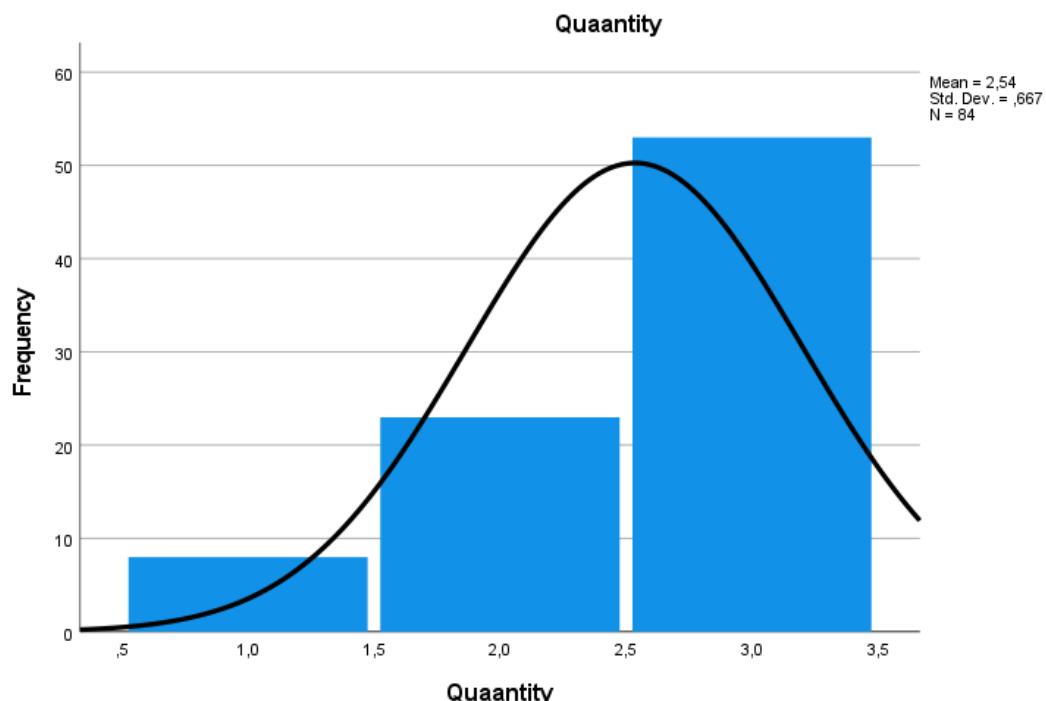
species of vegetables can live in each region properly give the solution First of all, we will discuss about the population. From the number of total production, the average is 79303,17857 tons production, the most frequently occurring data is high production representative by 3, and the median is high production representative by 3. The interquartile of the population data is 1 with high number of variance and standard deviation (10912672830 and 104463,7393). In this case, we can see that the distribution of our population data is very wide.

Statistics		Quaantity				
Quaantity			Frequency	Percent	Valid Percent	Cumulative Percent
N	Valid	84				
	Missing	0				
Mean		2,54	1	9,5	9,5	9,5
Median		3,00	2	27,4	27,4	36,9
Mode		3	3	63,1	63,1	100,0
			Total	100,0	100,0	

POPULATION	scale	tons
average	2,535714	79303,17857
q1	2	17299,25
q3	3	100648,75
interquartile	1	83349,5

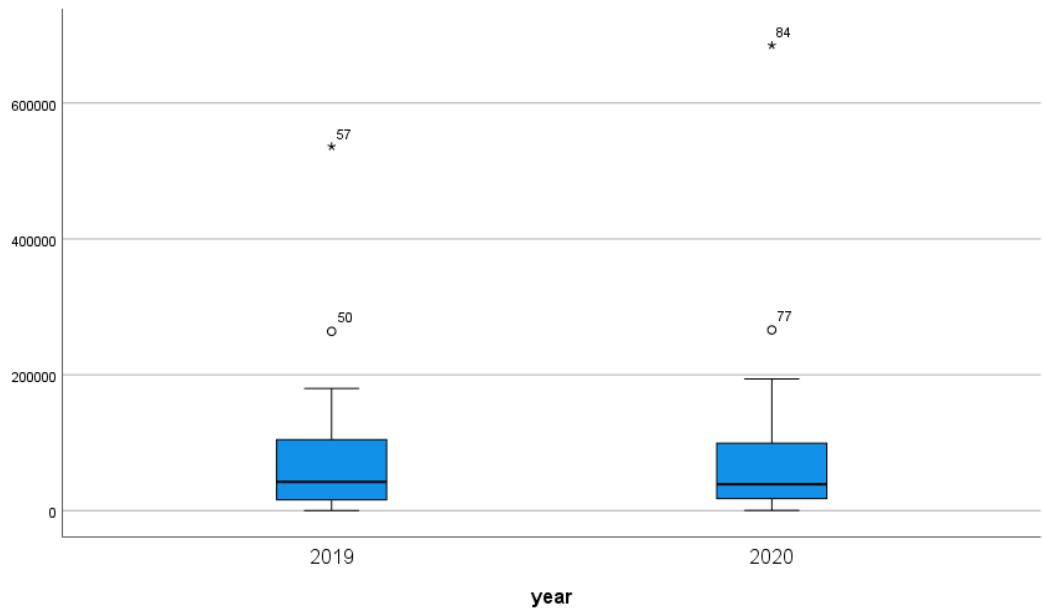
variance	0,439201	10912672830
stand deviation	0,662722	104463,7393

Histogram 1. Quantity scale (population)



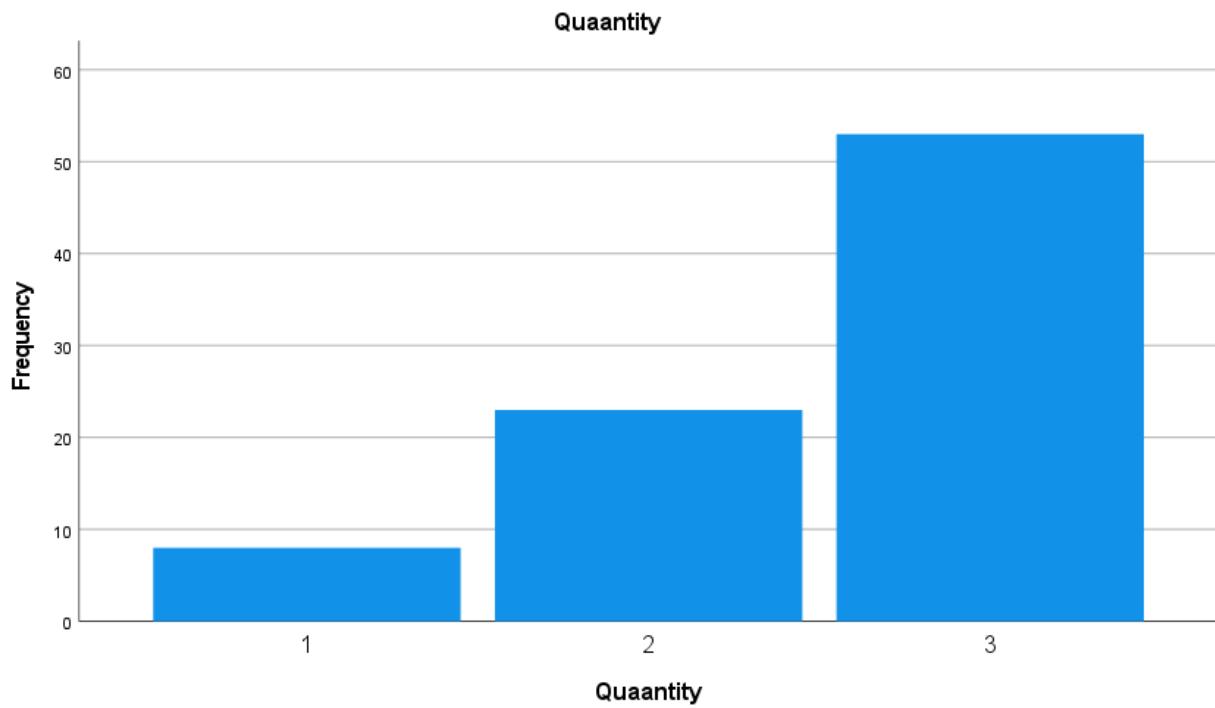
From the hidtogram above we can see the majority of production is reach into high capacity.

Boxplot 1. Quantity (population)

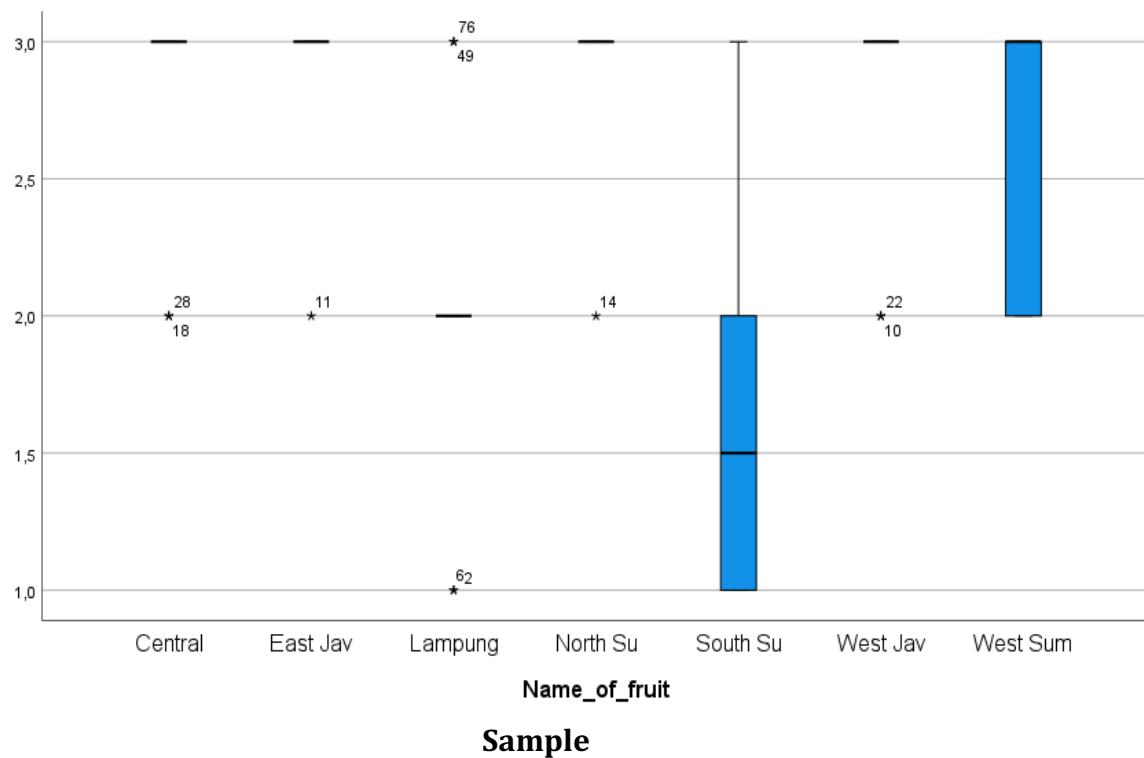


From the boxplot above we can see some number outside the blue square.

Bar chart 1. Quantity(Population)



Boxplot 2. Quantity (per province)



Statistics

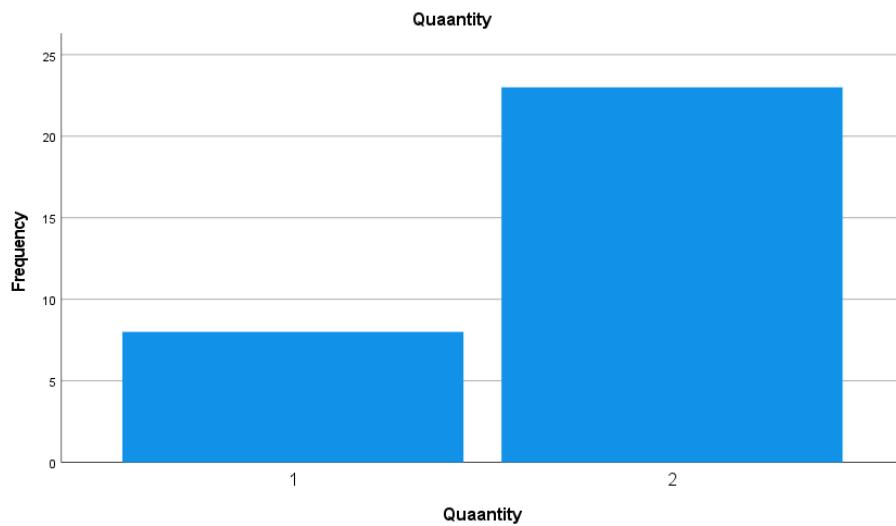
Quantity

N	Valid	31
	Missin	0
	g	
Mean		1,74
Median		2,00
Mode		2
Std. Deviation		,445
Variance		,198

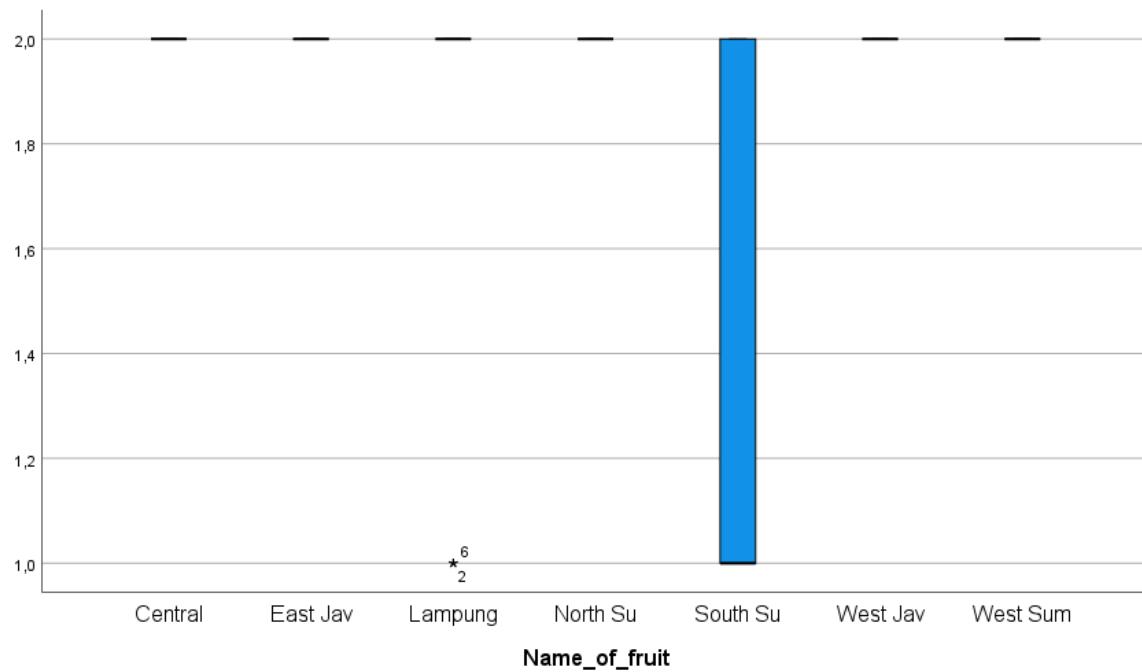
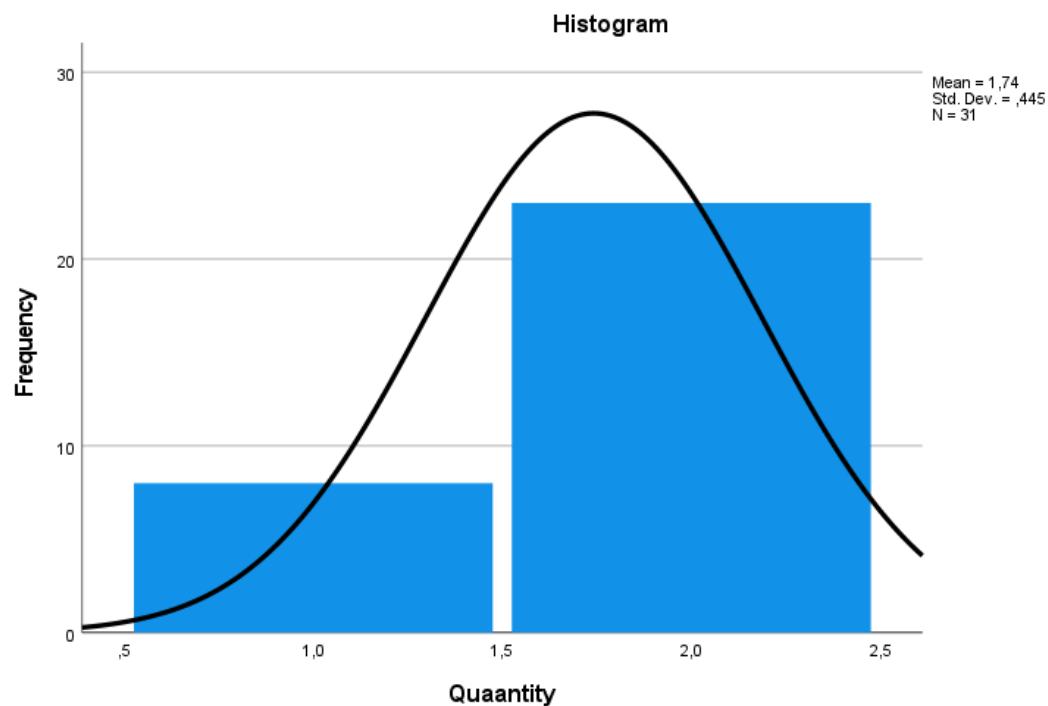
Percen tiles	25	1,00
	50	2,00
	75	2,00

Quantity					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid 1	8	25,8	25,8	25,8	
2	23	74,2	74,2	100,0	
Total	31	100,0	100,0		

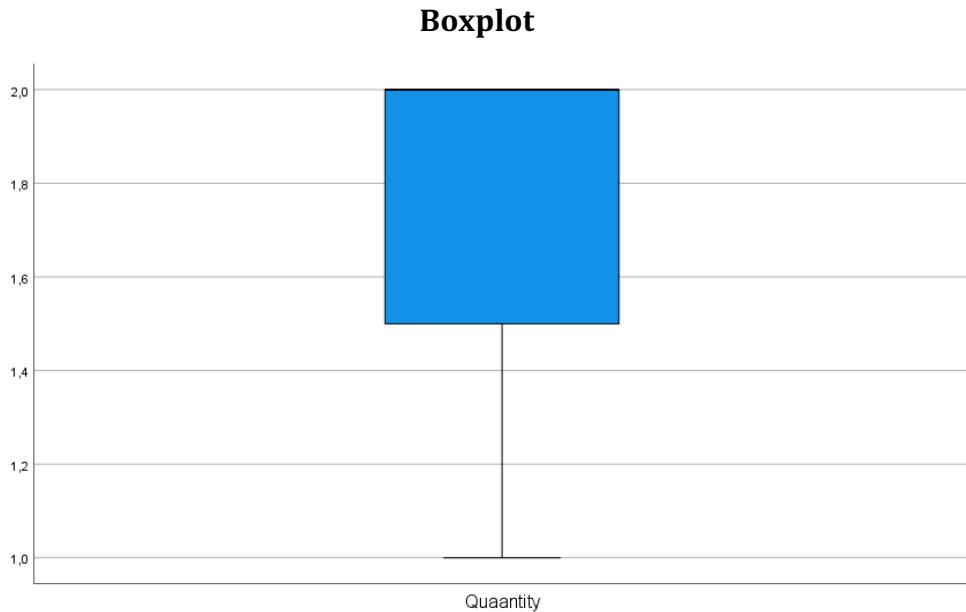
Bar Chart (sample)



From the bar chart above we can see the most frequency of total production vegetables in 7 province is medium production, and the low production is the priority to develop more.



As we can see from the box plot above the south sumatra is the one reach high frequency on medium and low production of vegetables which is 11, and this is important to prioritize more on south dumatra to develop more quantity product.



4. Message

In conclusion, we can see from the boxplot and histogram the south sumatra is the highest priority of province to develop more in production on vegetables variety. South sumatra is province majority in low and medium production of vegetables, so from this result we can consider south sumatra is the province to get improvement in case of production of vegetables from 7 province.

References

Data produksi sayuran di 7 provinsi 2019-2020 <https://bps.go.id/site/pilihdata>

CASE STUDY 3.

ENTERTAINMENT INDUSTRY

1. Motivation

1.1 Background

Nowadays the Entertainment industry has begun to reach different ways of approaching one of them being videos that are uploaded to the digital web as we know there are many streaming companies but one of the most popular among them is youtube. This digital era has brought people to a new level. From buying items. Watching entertainment, doing work, creating a business. And also to create profit among themselves. By posting on youtube the creators are rewarded with an amount of money. And Indonesian people are one of many that use this platform to generate income.

1.2 Objective

1. To identify the type of data provided
2. To analyze which Youtube channel type creates more income
3. To analyze the quantitative data related to subscribers and earnings
4. To analyze the qualitative data related to Youtube, channel type
5. To analyze the data using bar chart and/or pie chart, histogram, and boxplots

1.3 Question

1. What is the type of data provided?
2. Which youtube has the highest frequency of views based on the data?
3. How to define the quantitative data related to Subscribers and earnings?
4. How to define the qualitative data related to Youtube channels, views, and subscribers?
5. How to define the data using a bar chart and/or pie chart, histogram, and boxplot?

2. Method

2.1 Data

All the data we use to conduct this research is taken from socialblade.com, the data types we use for this research are Username, Channel type, Subscribers, Video views, and Monthly income.

2.2 Sampling

Our raw data and research population are based on the top fifty YouTubers in Indonesia. Our research sample framework is as follows:

Username	Channel Type	Subscribers	Video Views	Monthly Earning
Panji Petualang	Animals	9.07m	1,485,451,355	\$54k
Arif Muhammad	Comedy	13.9m	3,149,909,008	\$63.9k
Ini Talk Show	Comedy	9.48m	4,301,428,677	\$144.3k
Nessie Judge	Comedy	9.13m	1,279,593,920	\$178.1k
Islam Populer	Education	9.73m	839,624,885	\$61.4k
Ria Ricis	Entertainment	29.7 M	4,830,568,317	\$313k
Atta Halilintar	Entertainment	29.6m	3,883,832,048	\$241.8k
Rans Entertainment	Entertainment	23.3m	5,305,122,416	\$313.2k
Trans 7 Official	Entertainment	22.4m	11,641,869,080	\$754.3k
Baim Paula	Entertainment	20.3m	4,008,950,634	\$332.6k
Indosiar	Entertainment	19.7m	9,338,853,980	\$498.2k
Deddy Corbuzier	Entertainment	18.4m	3,677,211,240	\$613.3k
Gen Halilintar	Entertainment	17.9m	3,086,648,791	\$66k
Naisa Alifia Nay	Entertainment	17.4m	2,334,615,578	\$222.4k

Miawaug	Entertainment	17.3m	4,892,174,664	\$354.3k
Baby Bus	Entertainment	17.2m	9,462,609,412	\$489.4k
Surya Citra Televisi	Entertainment	17m	8,202,058,169	\$460.9k
Trans Tv Official	Entertainment	15.5m	8,420,362,770	\$262.5k
Zuni And Family	Entertainment	15.4m	5,504,183,388	\$251.7k
Tan Boy Kun	Entertainment	15.4m	2,761,087,648	\$319.4k
Rcti - Layar Drama Indonesia	Entertainment	14.9m	12,324,606,301	\$467.2k
Like Nastya Idn	Entertainment	14.3m	6,177,806,272	\$334.7k
Daftar Populer	Entertainment	14.1m	1,669,699,116	\$235.8k
Mnctv Official	Entertainment	13.2m	7,126,844,622	\$213.2k
The Shiny Peanut	Entertainment	12.9m	2,813,085,902	\$28.2k
Saaihalilintar	Entertainment	12.6m	1,098,181,269	\$7.2k
Yudist Ardhana	Entertainment	11.3m	3,316,806,924	\$563k
Jessica Jane	Entertainment	10.5m	1,587,545,476	\$118.5k
Hasanjr11	Entertainment	9.41m	1,082,984,200	\$170.5k
Ani Nurhayani	Entertainment	8.83m	1,545,916,774	\$124.8k
The Onsu Family	Entertainment	8.79m	1,410,776,384	\$29.1k
The Letsplay Family	Entertainment	8.63m	3,161,705,523	\$125k
Bobon Santoso	Entertainment	8.62m	1,245,921,377	\$118.6k
Nussa Official	Film	8.68m	2,398,930,906	\$156.1k
Jess No Limit	Games	24.3m	2,912,016,978	\$111.1k
Frost Diamond	Games	21.2m	4,853,702,907	\$382.9k
Dyland Pros	Games	15.3m	1,265,837,999	\$18.6k
Budi01 Gaming	Games	12.4m	1,021,671,143	\$31.4k

Frontal Gaming	Games	11.7m	245,370,246	\$8.7k
Efdewe	Games	9.35m	1,068,901,464	\$52k
Letda Hyper	Games	9.29m	792,241,866	\$22k
Rendy Rangers	Games	9.09m	1,597,099,614	\$23.8k
Kerajinan 5-Menit	Howto	15.1m	4,327,985,146	\$40.6k
Kompastv	News	11.5m	8,064,883,393	\$683.1k
Cnn Indonesia	News	9.06m	4,627,515,849	\$353.7k
Troom Troom Indonesia	People	11.6m	4,794,294,896	\$161.2k
Raditya Dika	People	9.71m	1,899,401,298	\$48k
Nihongo Mantappu	People	9.08m	1,814,240,971	\$301.3k
Sara Wijayanto	People	8.97m	934,944,897	\$48.6k
Gadgetin	Tech	8.89m	1,855,965,610	\$162.7k

In this research, we use cluster sampling technique, we divided the data into smaller sample data, we select 1 person for each channel type (Animals, Comedy, Education, Entertainment, Movies, Games, Howto, News, People, Technology), Sampling is selected randomly using Microsoft random selection formula Excel, from sampling we have ten data, The sampling category is to select one person from each type of channel. The Trust interval from us research is 95%.

Username	Channel Type
Panji Petualang	Animal
Ini Talk Show	Comedy
Islam Populer	Education
Trans 7 Official	Entertainment
Nussa Official	Film

Efdewe	Games
Kerajinan 5-Menit	Howto
Cnn Indonesia	News
Nihongo Mantappu	People
Gadgetin	Tech

3. Mechanics

3.1 Qualitative data

In this research, we use two qualitative data, namely username and channel type. The nominal data used for this research is

Table 2. Frame Frequency table

Channel type	Frequency
Entertainment	28
Games	8
Howto	1
Comedy	3
People	4
News	2
Animals	1
Tech	1
Film	1

Username	Channel Type

Panji Petualang	Animal
Ini Talk Show	Comedy
Islam Populer	Education
Trans 7 Official	Entertainment
Nussa Official	Film
Efdewe	Games
Kerajinan 5-Menit	Howto
Cnn Indonesia	News
Nihongo Mantappu	People
Gadgetin	Tech

From the table data above, the population frequency is based on fifty YouTuber lists based on the types of channels we collect, there are nine types of channel types concluded in fifty populations, for Entertainment there are twenty-eight YouTubers, for Games, there are eight Youtubers, Howto One Youtuber, Comedy three YouTuber, People four Youtuber, News two YouTuber, and lastly for Animal, tech film only has one YouTuber, We choose Username and Channel type for nominal data because the subject of Channel type is very important to choose YouTuber From channel type, we can see how many people are watching and we can see which channel has the most subscribers.

3.2. Quantitative

In this research, there are Three Quantitative Variables. They are number of subscribers, Video Views and also Monthly earnings 3 of the data chosen are strongly important to be taken into consideration when identifying earnings to its effect on channel type. By looking onto its views and subscriber it is important that the factors could be used to

predict its earnings of each youtuber. higher video views and large subscribers indicate a high income rate.

Username	Channel Type	Subscribers/m	Video Views
PANJI PETUALANG	Animal	9.07	1,485,451,355
Ini Talk Show	Comedy	9.48	4,301,428,677
Islam Populer	Education	9.73	839,624,885
Trans 7 Official	Entertainment	22.4	11,641,869,080
Nussa Official	Film	8.68	2,398,930,906
efdewe	Games	9.35	1,068,901,464
Kerajinan 5-Menit	Howto	15.1	4,327,985,146
CNN Indonesia	News	9.06	4,627,515,849
Nihongo Mantappu	People	9.08	1,814,240,971
GadgetIn	Tech	8.89	1,855,965,610

Table Quartile For Population (Top 50 Youtubers Indonesian)

		Channel types	subscribers	Vldeo Views	Monthly earning
N	Valid	50	50	50	50
	Missing	0	0	0	0
Minimum			9	245,370,246	\$7

Maximum			30	12,324,606,301	\$754
Q	1		9.25	1,466,782,612	\$53.500
	2		12.75	2,999,332,884	\$166.600
	3		17.23	4,863,320,846	\$333.130

As shown in the table above, the Q1 for the subscribers is 9.25M, for the views is 1,466,782,612, and for the Monthly earning is 53.500. The Q2 for the subscribers is 12.75M, for the views is 2,999,332,884, for the earning is \$166,600, and last, the Q3 for subscribers is 17.23M, for the Views is 4,863,320,846, and for the earning is \$333.130.

Table quartile for sample (ten random YouTubers)

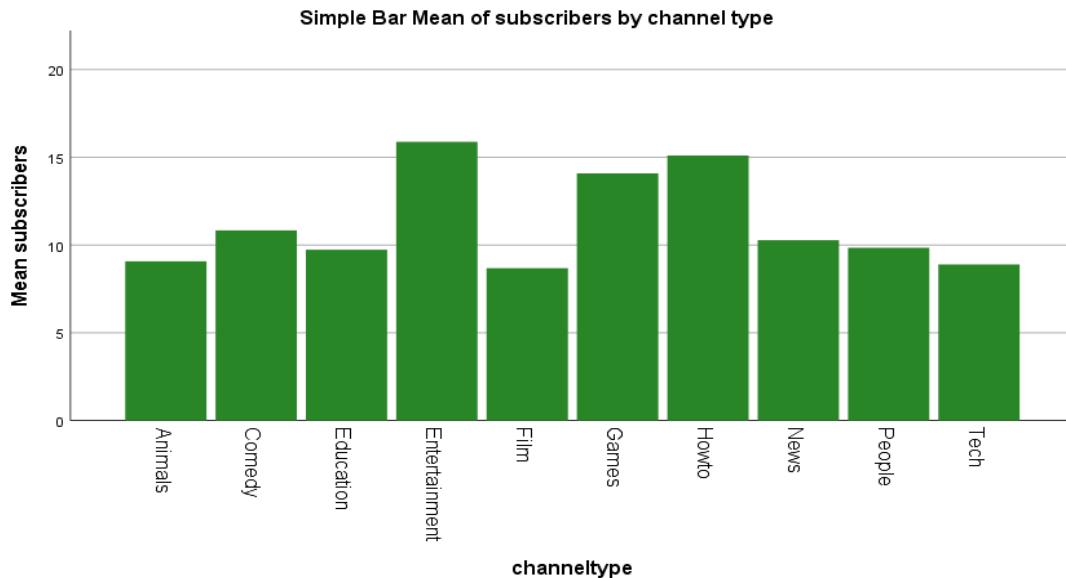
		subs	views	earning
N	Valid	10	10	10
	Missing	0	0	0
Minimum		8.68	839,624,885	\$40,600
Maximum		22.4	11,641,869,080	\$754,300
Quartiles	1	9.0175	1,381,313,882.25	\$53,500.00
	2	9.215	2,127,448,258.00	\$150,200.00
	3	11.0725	4,402,867,821.75	\$314,400.00

From this table it shows that Q1 (Quartiles1) for subscribers is 9.0, for views is 1,381,313,882, and for earning is \$53,500, the Q2 for subscribers is 9.215M, for Views 2,127,448,258, and for the earning is \$150,200, and last for Q3 there is 11.0725 for Subscribers, 4,402,867,821 for the Views, and \$314,400 for the earning.

Bar chart

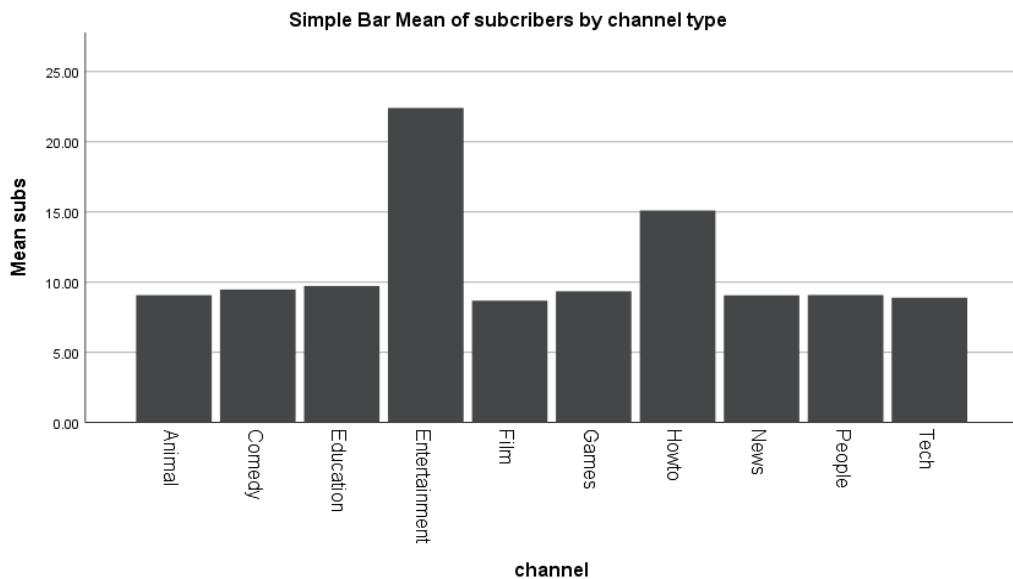
1. Subscribers by channel type

(Population)



In the above bar chart population, we can see that entertainment has the Highest number of subscribers, and howto is not far behind the entertainment, and for channel type film has the lowest number of subscribers.

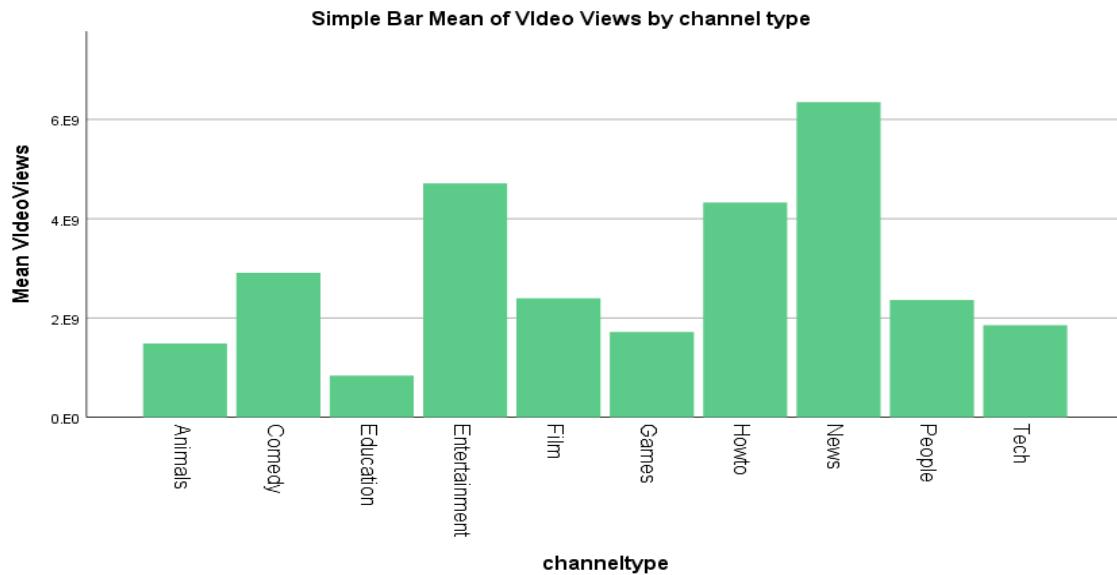
(Sample)



As we can see entertainment has the highest number of subscribers, and channel type Film has the lowest number of subscribers.

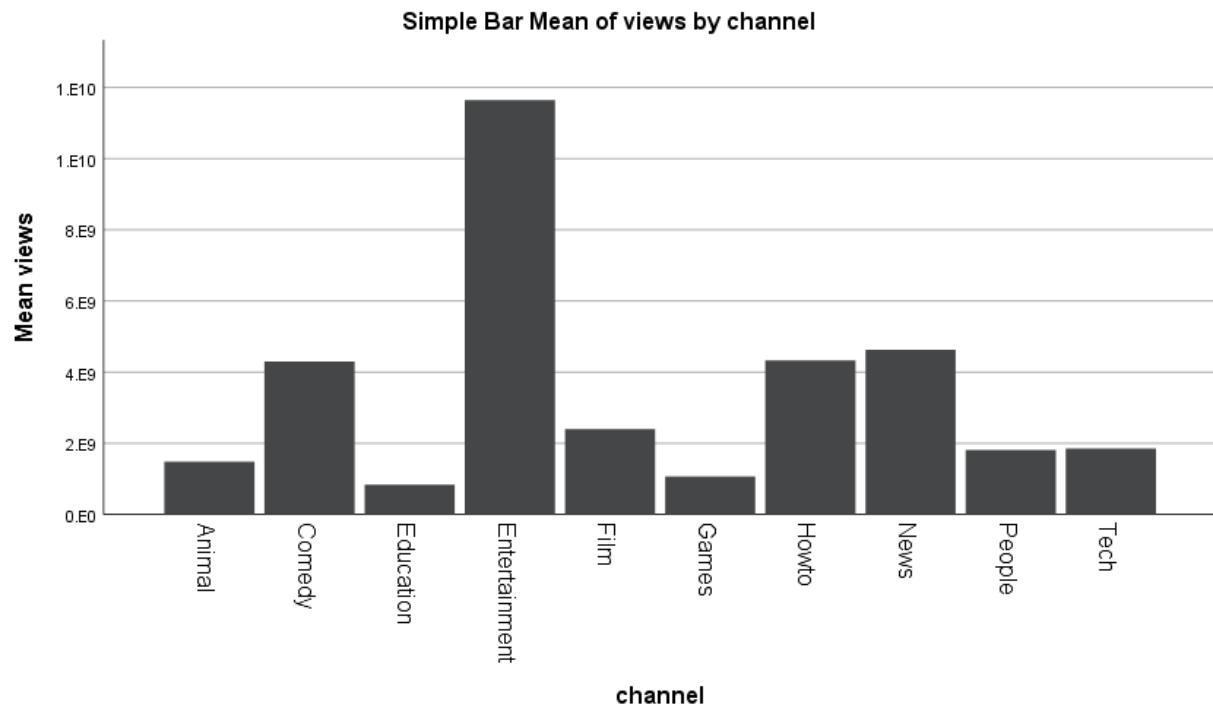
1. Video Views by Channel Type

(Population)



As we can see from the bar chart above, news has the highest video views, and the lowest video views are the education Channel type.

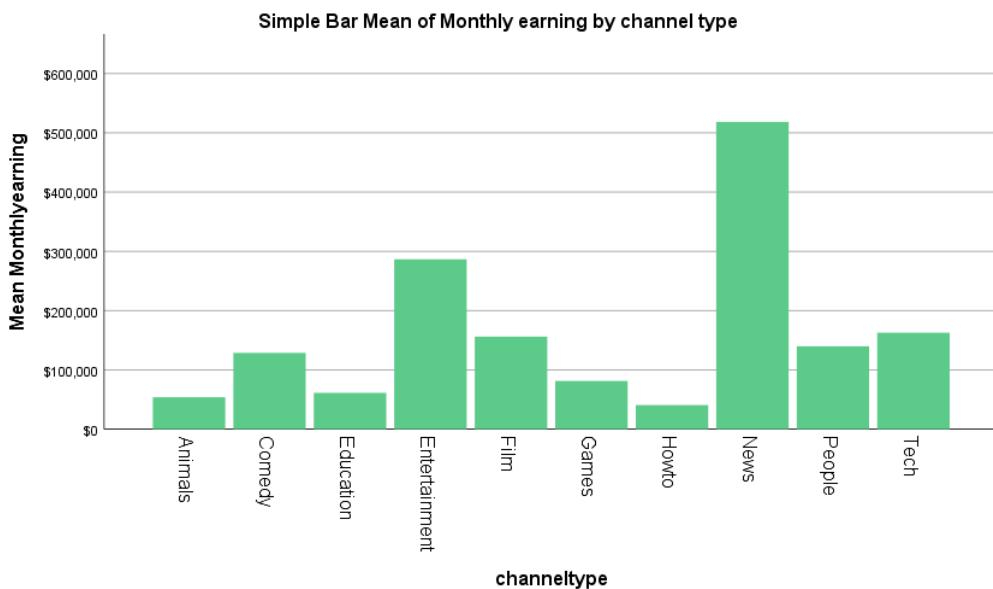
(sample)



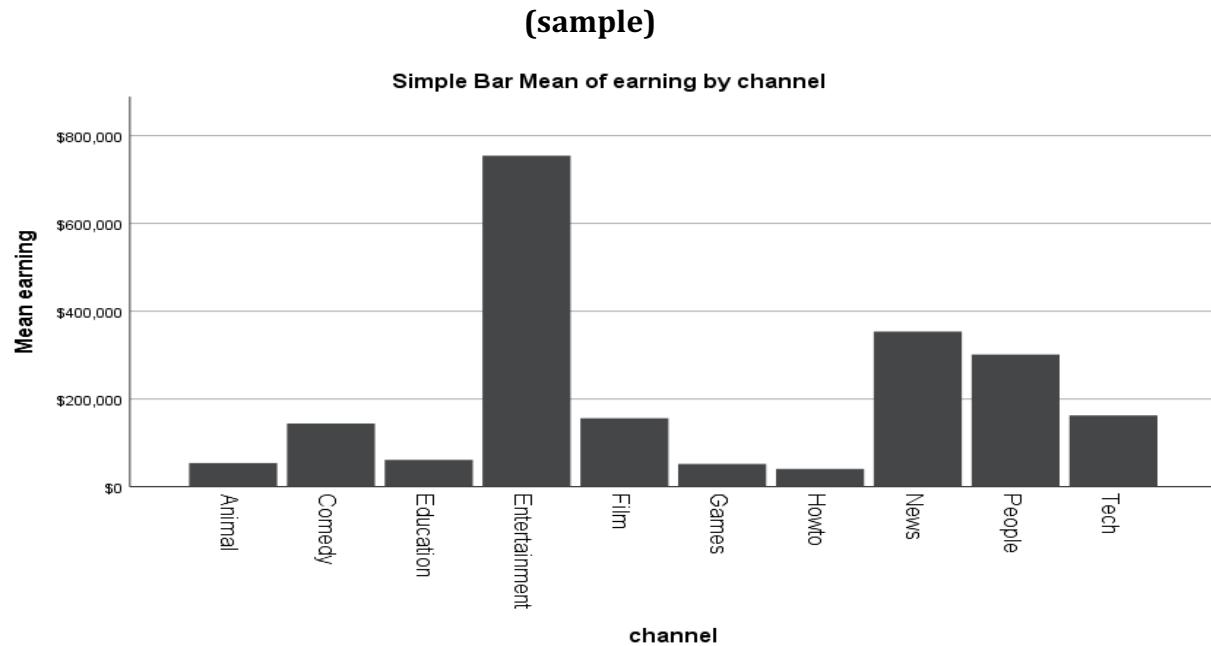
For sample bar char Entertainment has the highest video views and the lowest video views are Education channel type.

2. Monthly earning by channel type

(Population)

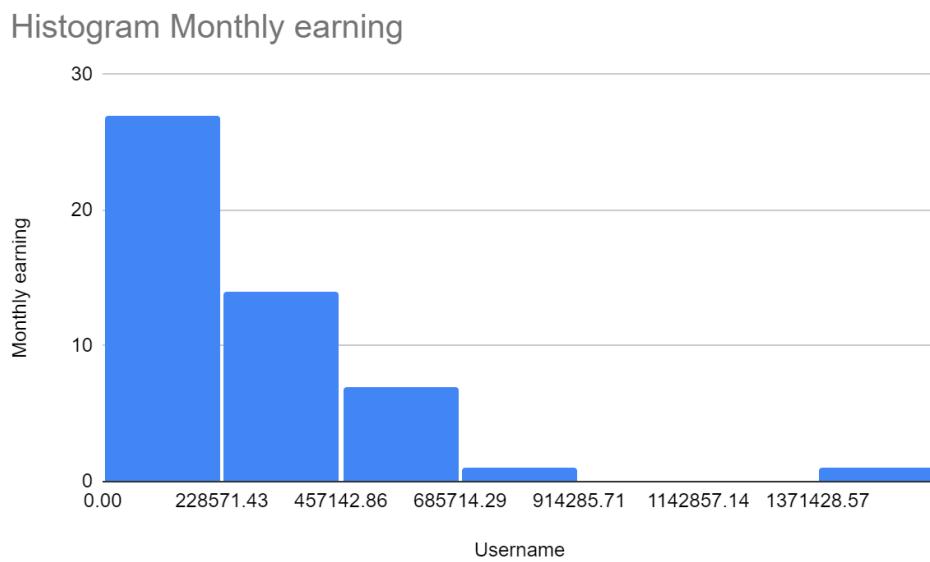


As we can see from Population bar chart Channel type news has the highest Monthly earning, and Howto has the lowest earning monthly.

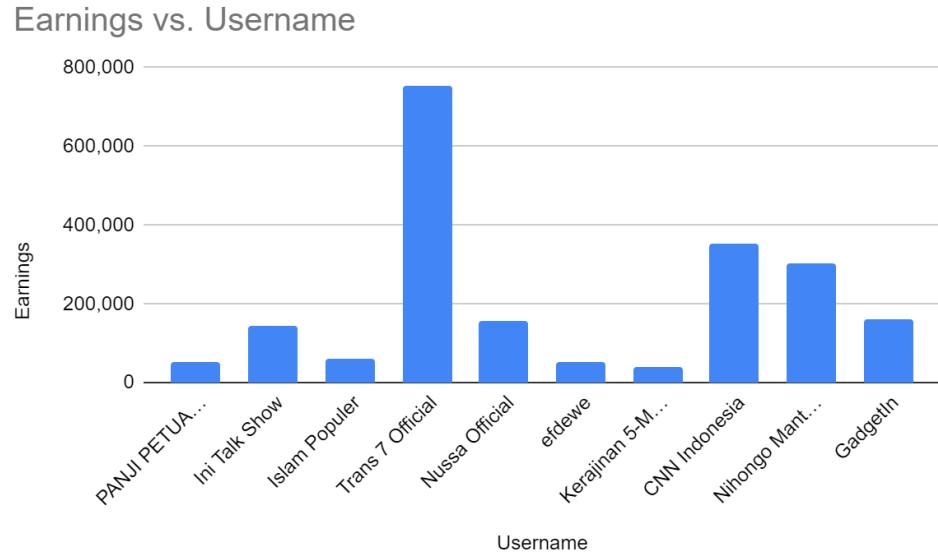


From Sample Bar chart channel type Entertainment has the highest Monthly earning, and channel type Howto has the lowest Monthly earning.

Histogram Of Earnings



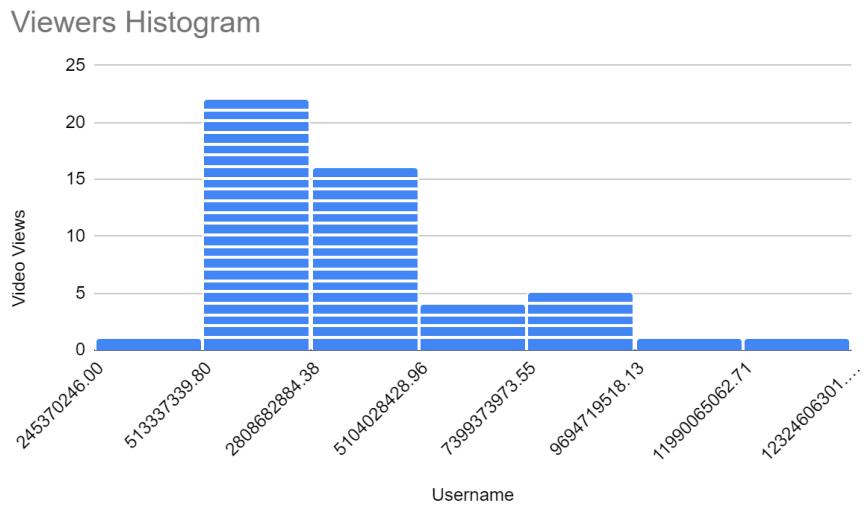
From the histogram above, we can see that most of the population data (number of Earnings) are in First and second class limit which is in scale of less than \$22,000 to \$457,000 Dollar.



From the histogram above, we can see that most of the Sample data (number of Earnings) are in First and second class limits which is in scale of less than \$40,600 to \$754,300 Dollar.

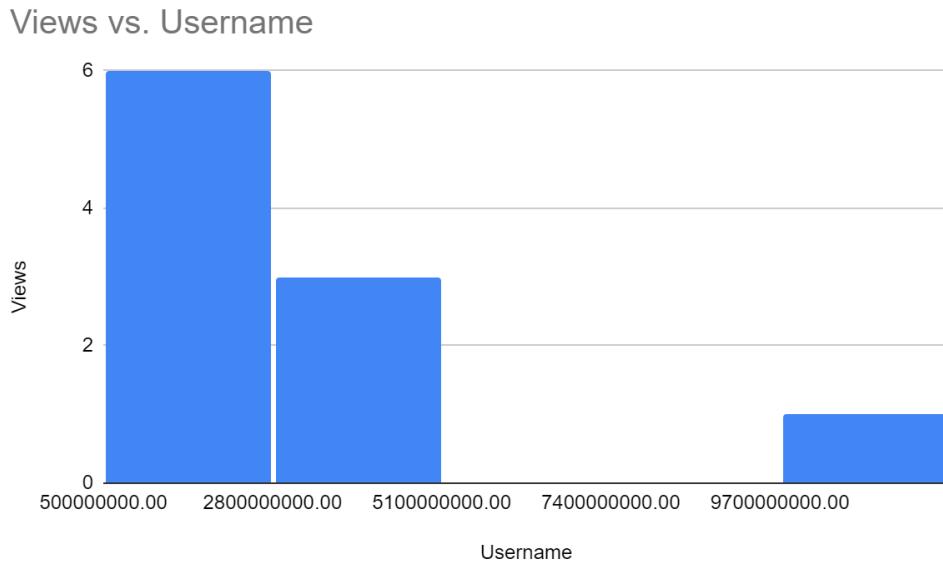
Histogram Views

Population data



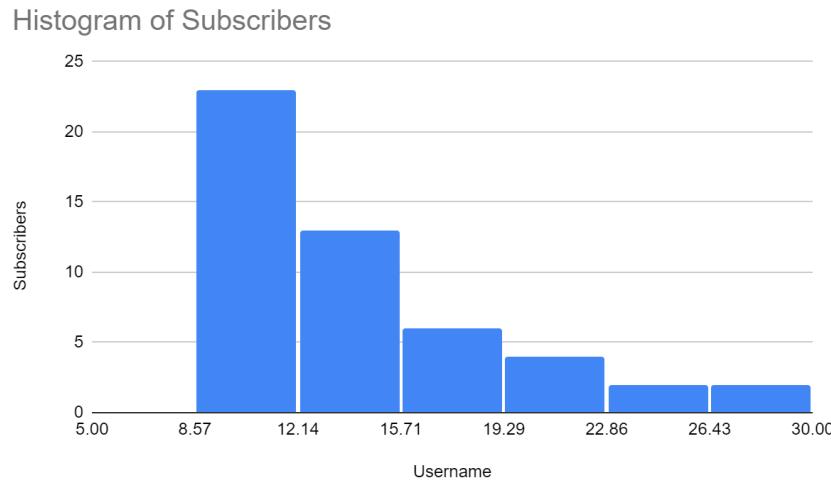
From the histogram above, we can see that most of the population data (number of Views) are in second and Third class limit which is in scale of less than 1.245.370.246 to 3.245.370.245 Viewers.

Data Sampling.



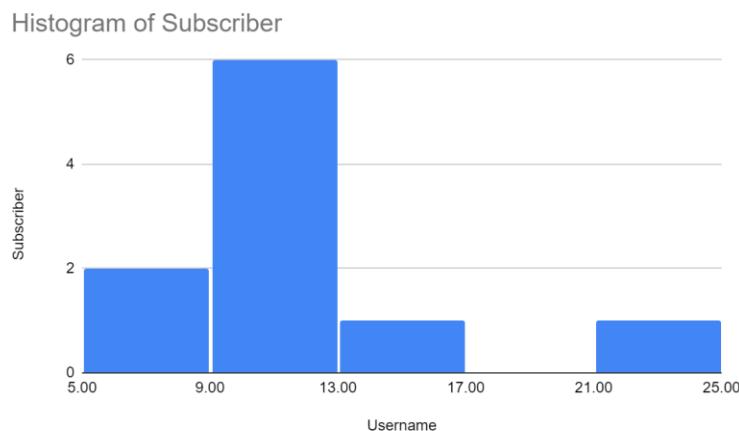
From the histogram above, we can see that most of the Sample data (number of Views) are in second and Third class limit which is in scale of less than 1.245.370.246 to 11,245.370.245 Viewers.

Data Population



From the histogram above, we can see that most of the Sample data (number of Views) are in second and Third class limit which is in scale of less than 8,000,000 to 15,000,000 Subscriber.

Data Sample



BOXPLOT

(population)

Statistics

		channeltype	subscribers	VideoViews	Monthlyearning
N	Valid	50	50	50	50
	Missing	0	0	0	0
Mean			14.0222	3748860826	\$222,726.00
Std. Deviation			5.42198	2932304524	\$190,335.719
Minimum			8.62	245,370,246	\$7,200
Maximum			29.70	1.E+10	\$754,300
Quartile	1		9.2900 ^a	1485451355 ^a	\$54,000.00 ^a
	2		12.7500	2999332885	\$166,600.00
	3		17.2000	4853702907	\$332,600.00

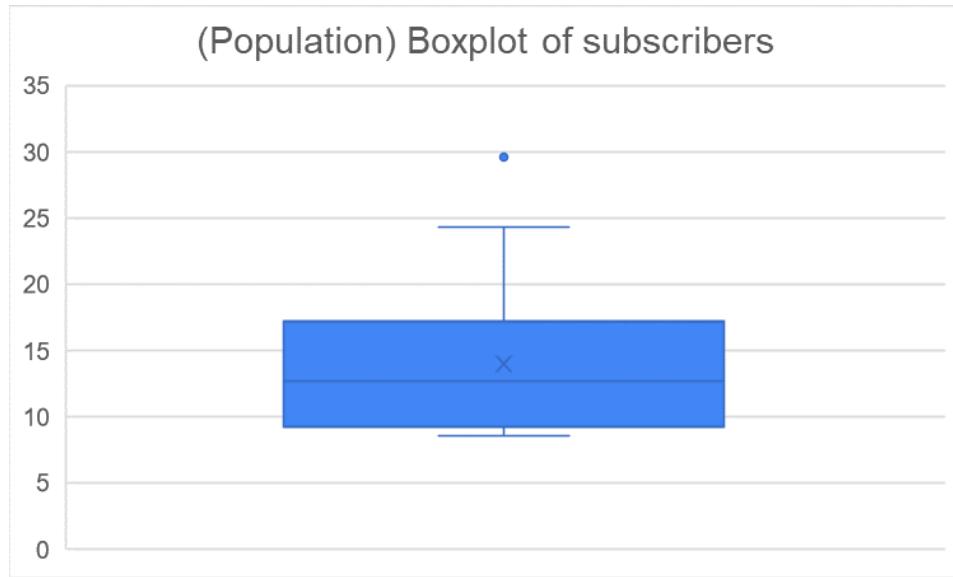
a. Percentiles are calculated from grouped data.

(Sample)

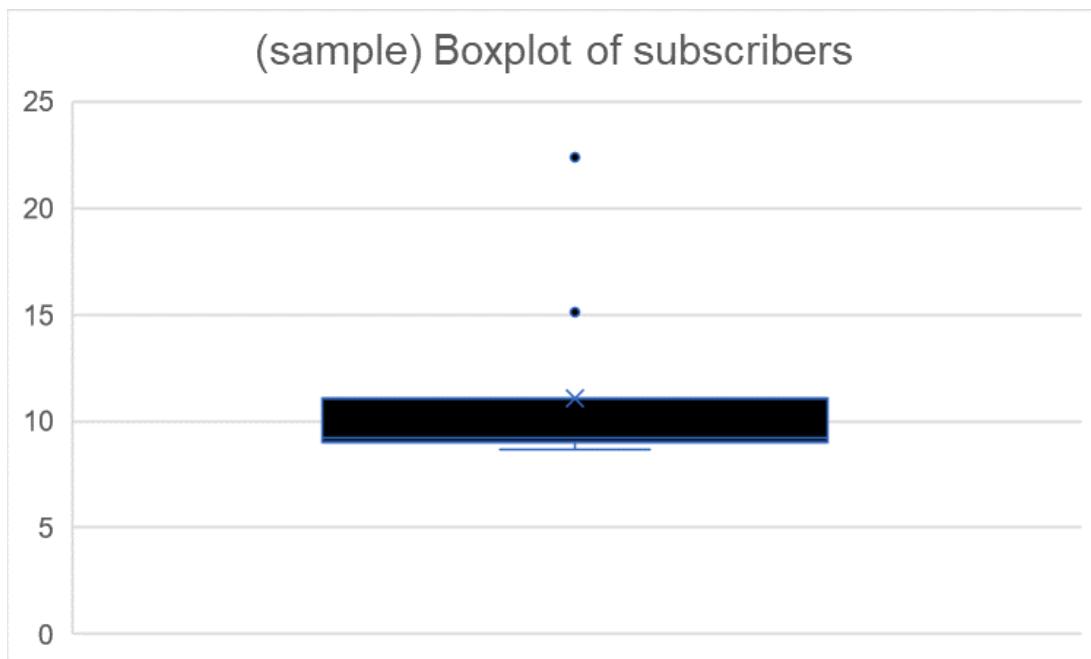
Statistics

		channel	subs	views	earning
N	Valid	10	10	10	10
	Missing	0	0	0	0
Mean			11.0840	3436191394	\$208,040.00
Std. Deviation			4.40145	3208524823	\$219,784.431
Minimum			8.68	839,624,885	\$40,600
Maximum			22.40	1.E+10	\$754,300
Quartiles	1		9.0175	1381313882	\$53,500.00
	2		9.2150	2127448258	\$150,200.00
	3		11.0725	4402867822	\$314,400.00

- Subscribers

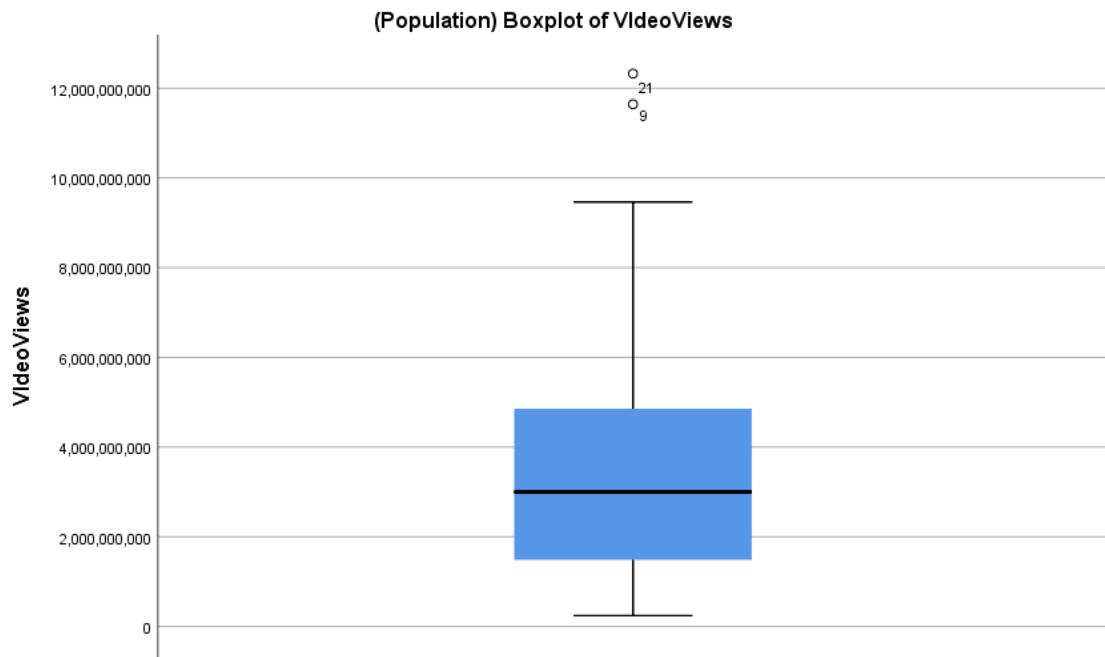


The population Boxplot of subscribers above shown the Q1 for the subscribers is 9.29 and the Q2 for the subscribers is 12.75 and last the Q3 for the subscribers is 17.2.

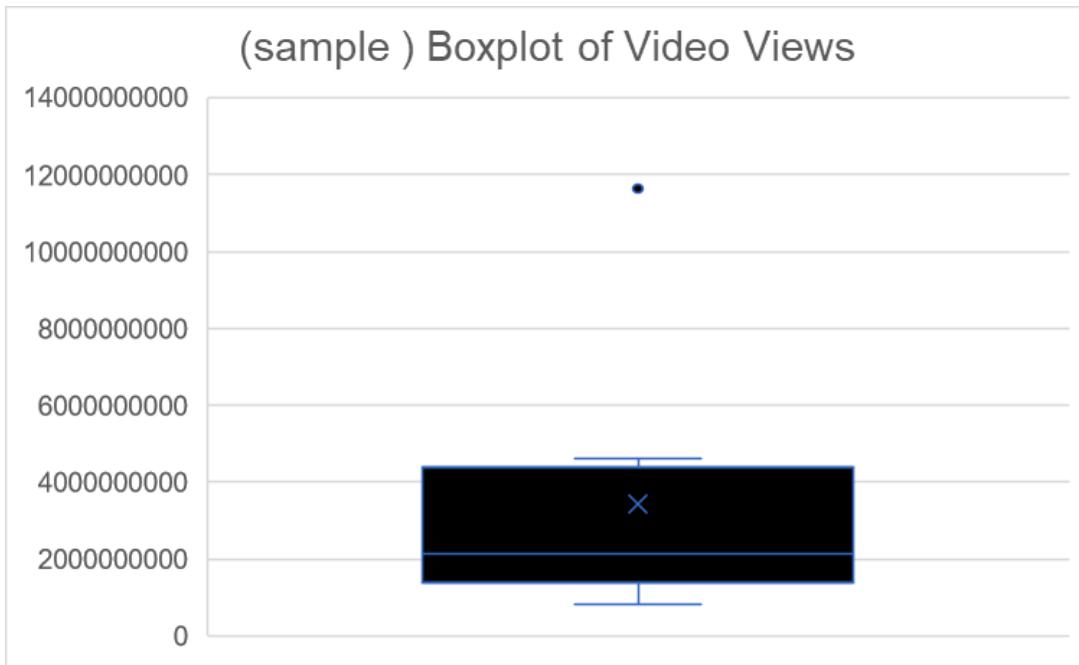


As we can see from sample boxplot of subscribers above, the Q1 for the subscribers is 9.0, For Q2 is 9.21, and lastly for the Q3 is 11.0.

2. Video Views

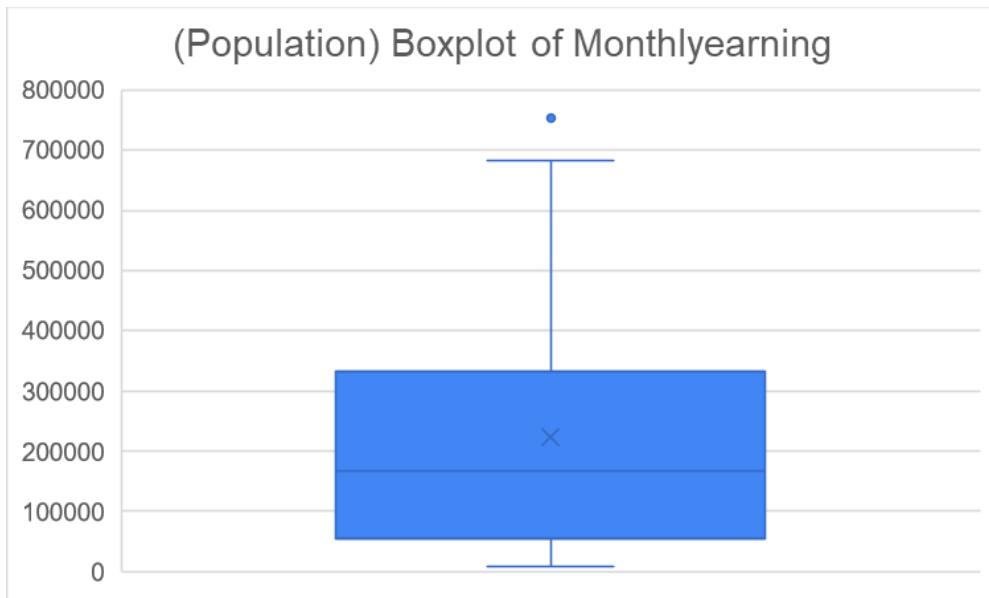


In the above Boxplot, the Q1 is 1,466,782,612, the Q2 is 2,999,332,884. And last the Q3 is 4,863,320,846.

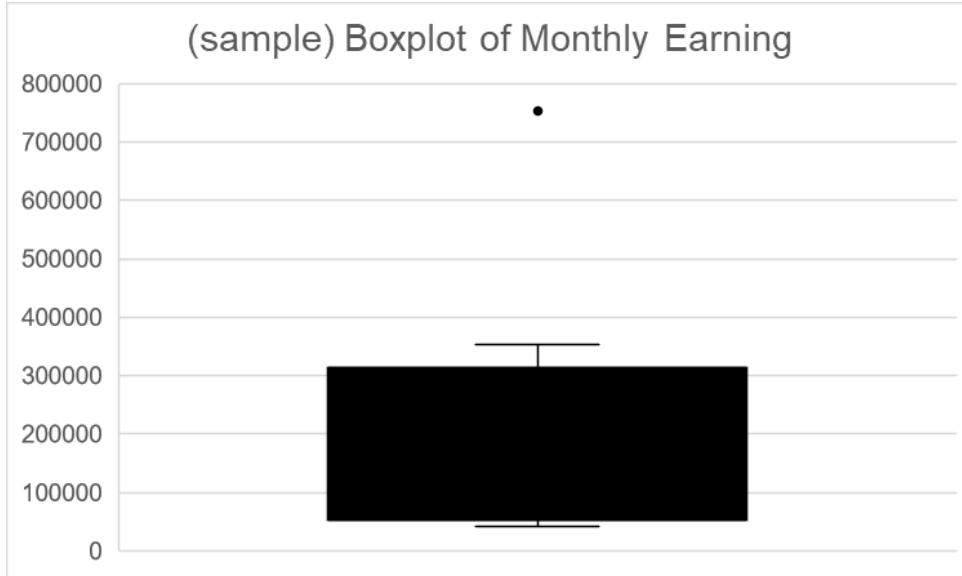


For sample boxplot of video views, the Q1 is 1,381,313,882, the Q2 is 2,127,448,258, and lastly the Q3 is 4,402,867,821.

3. Monthly earning



As we can see from the Boxplot above, The Q1 is \$222,726., the Q2 is \$166,600, and lastly the Q3 is \$333,130



For the sample, the Q1 is \$53,500, for the Q2 is \$150,200, and lastly for the Q3 is \$314,400.

4. Message

In according to the data above that our channel type that could generate more income is a news channel as its views are averaging higher than the others averaging at (\$518,400.00). Being a news channel has a wide range of audience due to a variety of viewer segmen this is by far the most amount of all population but if we see from the sampling we did, the largest being in the entertainment category which stands at \$754,000 with a view number of 11,641,869,080 making first For entertainment.

CASE STUDY 4.

STOCK PERFORMANCE OF LQ45 INDEX FROM 2017-2021

1. Motivation

1.1 Background

After the Covid-19 pandemic, Indonesia is currently entering a phase of economic recovery. Indonesia's economic recovery can be seen from the return of the flow of foreign investment into the Indonesian capital market. From an economic point of view, the capital market is an indicator of a country's economic progress and support (Ang, 1997). The capital market connects parties with excess funds (investors) with those who need funds (companies), creating an efficient allocation of funds (Tandelilin, 2001). Investment products in the capital market are stocks, bonds or debt securities, securities, exchange-traded funds, futures contracts on securities, warrants, rights issues, and other financial instruments.

The capital market is the same as the market in general but trades in financial instruments. In this paper, writers will further discuss one of the financial instruments: stock. Stocks are securities as evidence of inclusion or ownership of individuals or institutions within a company (Ang, 1997). Investing in stock implies putting the resources that an investor has in stock with the hope of allocating future benefits (returns) that also come with risks. Investors must consider the return and risk in investing. Stock returns consist of two components: periodic income distributed to shareholders from corporate profits (dividend yield) and profit on price differences (capital gain). Meanwhile, the risk is the possible loss experienced by investors, for example, the risk of liquidation.

With the end of the COVID-19 pandemic, writers are interested in knowing the difference in stock returns received by investors was in the pre-pandemic period (2017 - 2019) and during the pandemic (2020-2021). In this analysis, the shares of issuers listed on the Indonesia Stock Exchange, which are part of the LQ45 index, are used as objects of analysis

with an analysis period of 2017-2021. The LQ45 index was chosen because it is a list of blue-chip stocks that use 45 issuers with the most significant total stock transactions in the stock market, has the largest market capitalization, and has been listed on the IDX for at least three months. The Indonesia Stock Exchange routinely conducts an assessment of the LQ45 index every six months, every February and August. The authors focus on the financial sector stocks listed in the LQ45 index because it is the sector with the largest market capitalization based on the list provided by the IDX.

1.2 Objective

1. To analyze the difference in stock investing returns in the pre-pandemic (2017-2019) and during the pandemic (2020-2021) on LQ45 stocks.
2. To analyze the difference in stock investing risks in the pre-pandemic (2017-2019) and during the pandemic (2020-2021) on LQ45 stocks.

1.3 Question

1. Is there any difference in stock investing returns between the pre-pandemic (2017-2019) and during the pandemic (2020-2021) on LQ45 stocks?
2. Is there any difference in stock investing risks between the pre-pandemic (2017-2019) and during the pandemic (2020-2021) on LQ45 stocks?

2. METHOD

2.1 Data

The data used in this study is sourced from secondary data published by the Indonesia Stock Exchange (www.idx.co.id). Data obtained from the source includes the list of companies in the LQ45 index, the performance of the companies in the LQ45 index, and the monthly share closing price of the companies in the LQ45 index during the period January 2017 – December 2021 listed in the Indonesia Stock Exchange.

2.2 Population and sample

The population in this study are stocks listed in the LQ45 index on the Indonesia Stock Exchange in 11 consecutive periods, namely August 2016 to January 2017, February 2017 to July 2017, August 2017 to January 2018, February 2018 to July 2017, d July 2018, August 2018 to January 2019, February 2019 to July 2019, August 2019 to January 2020, February 2020 to July 2020, August 2020 to January 2021, February 2021 to July 2021, and August 2021 to January 2022. There are 27 stocks in total.

Table 1: LQ45 stocks listed in 11 consecutive periods (August 2016 – January 2022)

No	Code	Company's Name	Sector (Sub Sector)
1	ADRO	Adaro Energy Indonesia Tbk.	Mining (Coal mining)
2	AKRA	AKR Corporindo Tbk.	Trade, services & investment (Wholesale)
3	ANTM	Aneka Tambang (Persero) Tbk	Mining (Metal & mineral mining)
4	ASII	Astra International Tbk.	Misc. industry (Automotive & components)
5	BBCA	Bank Central Asia Tbk.	Finance (Bank)
6	BBNI	Bank Negara Indonesia (Persero) Tbk.	Finance (Bank)
7	BBRI	Bank Rakyat Indonesia (Persero) Tbk.	Finance (Bank)
8	BBTN	Bank Tabungan Negara (Persero) Tbk.	Finance (Bank)

9	BMRI	Bank Mandiri (Persero) Tbk.	Finance (Bank)
10	BSDE	Bumi Serpong Damai Tbk.	Property, real estate & building construction (Property & real estate)
11	GGRM	Gudang Garam Tbk.	Consumer goods industry (Tobacco manufacturers)
12	HMSPI	H.M. Sampoerna Tbk.	Consumer goods industry (Tobacco manufacturers)
13	ICBP	Indofood CBP Sukses Makmur Tbk	Consumer goods industry (Food & beverages)
14	INCO	Vale Indonesia Tbk	Mining (Metal & mineral mining)
15	INDF	Indofood Sukses Makmur Tbk.	Consumer goods industry (Food & beverages)
16	INTP	Indocement Tunggal Prakarsa Tbk.	Basic industry & chemicals (Cement)
17	JSMR	Jasa Marga (Persero) Tbk.	Infrastructure, utilities, & transportation (Toll road, airport, harbor & allied products)
18	KLBF	Kalbe Farma Tbk.	Consumer goods industry (Pharmaceuticals)
19	MNCN	Media Nusantara Citra Tbk.	Trade, services & investment (Advertising, printing & media)
20	PGAS	Perusahaan Gas Negara (Persero) Tbk.	Infrastructure, utilities, & transportation (Energy)

21	PTBA	Bukit Asam Tbk	Mining (Coal mining)
22	PTPP	PP (Persero) Tbk.	Property, real estate & building construction (Building construction)
23	SMGR	Semen Indonesia (Persero) Tbk.	Basic industry & chemicals (Cement)
24	TLKM	Telekomunikasi Indonesia (Persero) Tbk.	Infrastructure, utilities, & transportation (Telecommunication)
25	UNTR	United Tractors Tbk.	Trade, services & investment (Wholesale)
26	UNVR	Unilever Indonesia Tbk.	Consumer goods industry (Cosmetics & household)
27	WIKA	Wijaya Karya (Persero) Tbk.	Property, real estate & building construction (Building construction)

The sample used in this analysis did not use all population members. The determination of the sample used is a non-probability purposive sampling method, which is taking a sample with specific criteria desired by the analyst who aims to obtain a representative sample. The criteria used are as follows:

1. Companies that provide monthly share price data for the period 2017 – 2021.
2. Companies that have been part of the financial sector for 11 consecutive periods in LQ45 from August 2016 to January 2022.

Based on these criteria, all the population as samples in this study were five stocks, with the following description:

Table 2: Sample

No	Code	Company's Name	Sector (Sub Sector)
1	BBCA	Bank Central Asia Tbk.	Finance (Bank)

2	BBNI	Bank Negara Indonesia (Persero) Tbk.	Finance (Bank)
3	BBRI	Bank Rakyat Indonesia (Persero) Tbk.	Finance (Bank)
4	BBTN	Bank Tabungan Negara (Persero) Tbk.	Finance (Bank)
5	BMRI	Bank Mandiri (Persero) Tbk.	Finance (Bank)

Data analysis will be carried by SPSS at significance level $\alpha = 0.05$ (95% confidence interval).

3. Mechanics

3.1 Qualitative data

In analyzing stock performance, fundamental analysis can be used on aspects of a stock's return and risk, which are unmeasurable by a number. Nominal data is used in this study by categorizing the sample by the type of the company, whether the company is state-owned or private-owned in the period of 2017 - 2021.

Table 3: Type of the company listed in LQ45 2017 - 2021

Company	2017	2018	2019	2020	2021
BBCA	Private-owned	Private-owned	Private-owned	Private-owned	Private-owned
BBNI	State-owned	State-owned	State-owned	State-owned	State-owned
BBRI	State-owned	State-owned	State-owned	State-owned	State-owned
BBTN	State-owned	State-owned	State-owned	State-owned	State-owned
BMRI	State-owned	State-owned	State-owned	State-owned	State-owned

From the table above, state-owned enterprises are dominating and there's no change in the company type in the range of 2017 – 2021. According to ADBI Working Paper 950 (2019), state-owned enterprises tend to be less profitable than private-owned enterprises. Following the study, it is known that profitability has a significant relationship with stock return (Allozi, 2016).

3.2 Quantitative data

Data used in this study is in the form of monthly closing stock prices which are then processed to obtain the monthly stock returns of BBCA, BBNI, BBRI, BBTN, and BMRI using the formula:

$$Return_t = \frac{Closing\ price_t - Closing\ price_{t-1}}{Closing\ price_{t-1}}$$

Table 4: Monthly Stock Return of BBCA for 2017 – 2021

2017	2018	2019	2020	2021
-0.012903226	0.037671233	0.083653846	-0.030665669	-0.001477105
0.009803922	0.01980198	-0.021295475	-0.029320988	-0.00739645
0.071197411	0.005393743	-0.000906618	-0.121621622	-0.073770492
0.072507553	-0.051502146	0.043557169	-0.064253394	0.030571199
-0.033802817	0.027149321	0.012173913	0.003868472	-0.004683841
0.058309038	-0.053964758	0.030068729	0.097302505	-0.054901961
0.03030303	0.083818393	0.032527106	0.095697981	-0.009128631
0.013368984	0.065520945	-0.01453958	0.005608974	0.097152429
0.071240106	-0.026209677	-0.004918033	-0.13625498	0.06870229
0.02955665	-0.020703934	0.036243822	0.068265683	0.067857143
-0.026315789	0.101479915	-0.001589825	0.071675302	-0.026755853

0.076167076	-0.001919386	0.064490446	0.0910556	0.003436426
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Table 3 above is a list of stock returns from Bank Central Asia for the 2017 – 2021 period. These results are the returns obtained by investors per share they own. For example, the recovery in March 2017 is 0.071197411 or 7.12% per share.

Table 5: Monthly Stock Return of BBNI for 2017 – 2021

2017	2018	2019	2020	2021
0.031674208	-0.050505051	0.03125	-0.082802548	-0.101214575
0.096491228	0.034574468	-0.03030303	-0.024305556	0.072072072
0.036	-0.107969152	0.068181818	-0.456227758	-0.037815126
-0.015444015	-0.07204611	0.021276596	0.073298429	-0.004366812
0.02745098	0.052795031	-0.125	-0.065853659	-0.052631579
0.007633588	-0.168141593	0.095238095	0.195822454	-0.142592593
0.128787879	0.04964539	-0.078804348	0.004366812	0.032397408
-0.013422819	0.054054054	-0.091445428	0.108695652	0.129707113
0.006802721	-0.051282051	-0.045454545	-0.129411765	-0.00462963
0.027027027	-0.010135135	0.044217687	0.067567568	0.302325581
0.065789474	0.160409556	-0.022801303	0.265822785	-0.028571429
0.222222222	0.035294118	0.046666667	0.029166667	-0.007352941

Table 4 above is a list of stock returns from Bank Negara Indonesia (Persero) for the 2017 – 2021 period. These results are the returns obtained by investors per share they own. For example, the recovery in February 2018 is 0.034574468 or 3.46% per share.

Table 6: Monthly Stock Return of BBRI for 2017 – 2021

2017	2018	2019	2020	2021
0.004282655	0.016483516	0.051912568	0.013636364	0.002398082
0.019189765	0.021621622	0	-0.060538117	0.126794258
0.085774059	-0.047619048	0.067532468	-0.279236277	-0.06581741
-0.005780347	-0.105555556	0.063260341	-0.09602649	-0.079545455
0.122093023	-0.043478261	-0.061784897	0.080586081	0.051851852
0.053540587	-0.077922078	0.063414634	0.027118644	-0.075117371
-0.031147541	0.080985915	0.027522936	0.04290429	-0.058375635
0.023688663	0.035830619	-0.046875	0.110759494	-0.037017378
0.009917355	-0.009433962	-0.035128806	-0.133903134	0.077626767
0.021276596	0	0.02184466	0.105263158	0.103896104
0.028846154	0.149206349	-0.028503563	0.217261905	-0.037647059
0.133956386	0.011049724	0.075794621	0.019559902	0.004889976

Table 5 above is a list of stock returns from Bank Rakyat Indonesia (Persero) for the 2017 – 2021 period. These results are the returns obtained by investors per share they own. For example, the recovery in December 2019 is 0.075794621 or 7.58% per share.

Table 7: Monthly Stock Return of BBTN for 2017 – 2021

2017	2018	2019	2020	2021
0.094827586	0.025210084	0.078740157	-0.117924528	-0.089855072

0.12335958	0.021857923	-0.113138686	-0.090909091	0.318471338
0.060747664	0.016042781	0.008230453	-0.505882353	-0.169082126
0.013215859	-0.181578947	0.032653061	0.047619048	-0.075581395
0.086956522	-0.019292605	-0.023715415	-0.136363636	0.028301887
0.04	-0.196721311	-0.004048583	0.638157895	-0.162079511
0	-0.036734694	0	0.016064257	-0.040145985
0.157692308	0.165254237	-0.18699187	0.245059289	0.068441065
0.046511628	-0.043636364	-0.02	-0.238095238	0.010676157
-0.123809524	-0.19391635	-0.051020408	0.158333333	0.253521127
0.15942029	0.259433962	0.14516129	0.183453237	-0.039325843
0.115625	-0.048689139	-0.004694836	0.048632219	0.011695906

Table 6 above is a list of stock returns from Bank Tabungan Negara (Persero) for the 2017 – 2021 period. These results are the returns obtained by investors per share they own. For example, the recovery in April 2020 is 0.047619048 or 4.76% per share.

Table 8: Monthly Stock Return of BMRI for 2017 – 2021

2017	2018	2019	2020	2021
-0.058315335	0.01875	0.010169492	-0.016286645	0.039525692
0.036697248	0.018404908	-0.043624161	-0.036423841	-0.064638783
0.035398230	-0.075301205	0.049122807	-0.356701031	0
0	-0.071661238	0.033444816	-0.047008547	0.004065041

0.076923077	-0.010526316	-0.006472492	0.002242152	-0.028340081
0.011904762	-0.028368794	0.045602606	0.10738255	-0.016666667
0.070588235	-0.02919708	-0.00623053	0.171717172	-0.033898305
-0.04029304	0.037593985	-0.090909091	0.025862069	0.070175439
0.026717557	-0.025362319	-0.037931034	-0.166386555	0.008196721
0.048327138	0.018587361	0.007168459	0.164314516	0.166666667
0.04964539	0.080291971	-0.007117438	0.095238095	-0.024390244
0.081081081	-0.003378378	0.100358423	0	0.003571429

Table 7 above is a list of stock returns from Bank Mandiri (Persero) for the 2017 – 2021 period. These results are the returns obtained by investors per share they own. For example, the recovery in October 2021 is 0.166666667 or 16.67% per share.

Table 9: Descriptive Analysis Results

		Statistic	Std. Error
Return2017	Mean	.0427	.00750
	95% Confidence Interval for Mean	.0277 Upper Bound	.0577
	Mode	.00	
	Median	.0335	
	Variance	.003	
	Std. Deviation	.05807	
	Minimum	-.12	

	Maximum	.22	
	Interquartile Range	.07	
	Quartile 1	.0082	
	Quartile 3	.0753	
Return2018	Mean	-.0026	.01067
	95% Confidence Interval for Mean	Lower Bound Upper Bound	-.0240 .0187
	Mode (Multiple modes exist. The smallest value is shown)		-.20
	Median		-.0010
	Variance		.007
	Std. Deviation		.08265
	Minimum		-.20
	Maximum		.26
	Interquartile Range		.08
	Quartile 1		-.0484
	Quartile 3		.0357
Return2019	Mean	.0048	.00764
	95% Confidence Interval for Mean	Lower Bound Upper Bound	-.0105 .0201
	Mode		.00
	Median		.0036
	Variance		.003

	Std. Deviation	.05915	
	Minimum	-.19	
	Maximum	.15	
	Interquartile Range	.07	
	Quartile 1	-.0273	
	Quartile 3	.0453	
Return2020	Mean	.0046	.02225
	95% Confidence Interval for Mean	Lower Bound Upper Bound	-.0399 .0491
	Mode (Multiple modes exist. The smallest value is shown)		-.51
	Median	.0149	
	Variance	.030	
	Std. Deviation	.17236	
	Minimum	-.51	
	Maximum	.64	
	Interquartile Range	.17	
	Quartile 1	-.0786	
	Quartile 3	.0956	
Return2021	Mean	.0083	.01209
	95% Confidence Interval for Mean	Lower Bound Upper Bound	-.0159 .0325

	Mode (Multiple modes exist. The smallest value is shown)		.17	
	Median		-.0045	
	Variance		.009	
	Std. Deviation		.09368	
	Minimum		-.17	
	Maximum		.32	
	Range		.49	
	Interquartile Range		.09	
	Quartile 1		-.0399	
	Quartile 3		.0488	
Return2017 -2019	Mean		.0237	.00560
	95% Confidence Interval for Mean	Lower Bound	.0126	
		Upper Bound	.0348	
	Mode		.00	
	Median		.0269	
	Variance		.004	
	Std. Deviation		.06139	
	Minimum		-.19	
	Maximum		.22	
	Range		.41	

	Interquartile Range	.07
	Quartile 1	-.0070
	Quartile 3	0.0634
Return2020- 2021	Mean	.0065
	95% Confidence Interval for Mean	Lower Bound
		-.0185
		Upper Bound
		.0314
	Mode	.00
	Median	.0029
	Variance	.019
	Std. Deviation	.13814
	Minimum	-.51
	Maximum	.64
	Range	1.14
	Interquartile Range	0.13
	Quartile 1	-.0575
	Quartile 3	.0713

Table 6 above is the descriptive analysis result of data listed in tables 3, 4, 5, 6, and 7 processed using IBM SPSS software version 25. The 2017 return data consists of 60 monthly BBCA, BBNI, BBRI, BBTN, and BMRI stock returns in 2017. Using SPSS, it is known that the average return of LQ45 in 2017 is 0.0427 or 4.27%. The risk or standard deviation of LQ45 in 2017 is 0.05807 or 5.8%, obtained with a variance 0.003 or 0.3%. The monthly

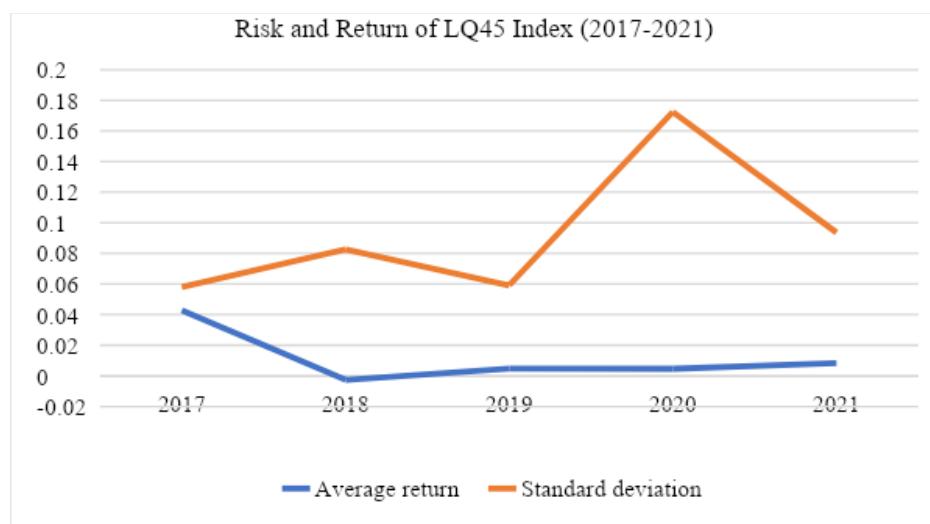
return that appears most often is 0.00. Biggest return achieved in 2017 is 22% and lowest return achieved in 2017 is minus 12%.

The middle number or median from the data is 0.0335 or 3.35%. The first quartile (Q_1) and third quartile (Q_3) from the data is 0.0082 (0.82%) and 0.0753 (7.53%). The statistical dispersion or interquartile range of the data is 0.10. The 2018 return data consists of 60 monthly BBCA, BBNI, BBRI, BBTN, and BMRI stock returns in 2018. Using SPSS, it is known that the average return of LQ45 in 2018 is minus 0.0026 or -0.26%. The risk or standard deviation of LQ45 in 2018 is 0.08265 or 8.265%, obtained with a variance 0.007 or 0.7%. The lowest monthly return that appears most often is -20%. Biggest return achieved in 2018 is 26% and lowest return achieved in 2018 is minus 20%. The middle number or median from the data is -0.0010 or -0.1%. The first quartile (Q_1) and third quartile (Q_3) from the data is -0.0484 (-4.84%) and 0.0357 (3.57%). The statistical dispersion or interquartile range of the data is 0.08.

The 2019 return data consists of 60 monthly BBCA, BBNI, BBRI, BBTN, and BMRI stock returns in 2019. Using SPSS, it is known that the average return of LQ45 in 2019 is 0.0048 or 0.48%. The risk or standard deviation of LQ45 in 2019 is 0.05915 or 5.915%, obtained with a variance 0.003 or 0.3%. The monthly return that appears most often is 0.00. Biggest return achieved in 2019 is 15% and lowest return achieved in 2019 is minus 19%. The middle number or median from the data is 0.0036 or 0.36%. The first quartile (Q_1) and third quartile (Q_3) from the data is -0.0273 (-2.73%) and 0.0453 (4.53%). The statistical dispersion or interquartile range of the data is 0.07. The 2020 return data consists of 60 monthly BBCA, BBNI, BBRI, BBTN, and BMRI stock returns in 2020. Using SPSS, it is known that the average return of LQ45 in 2020 is 0.0046 or 0.46%.

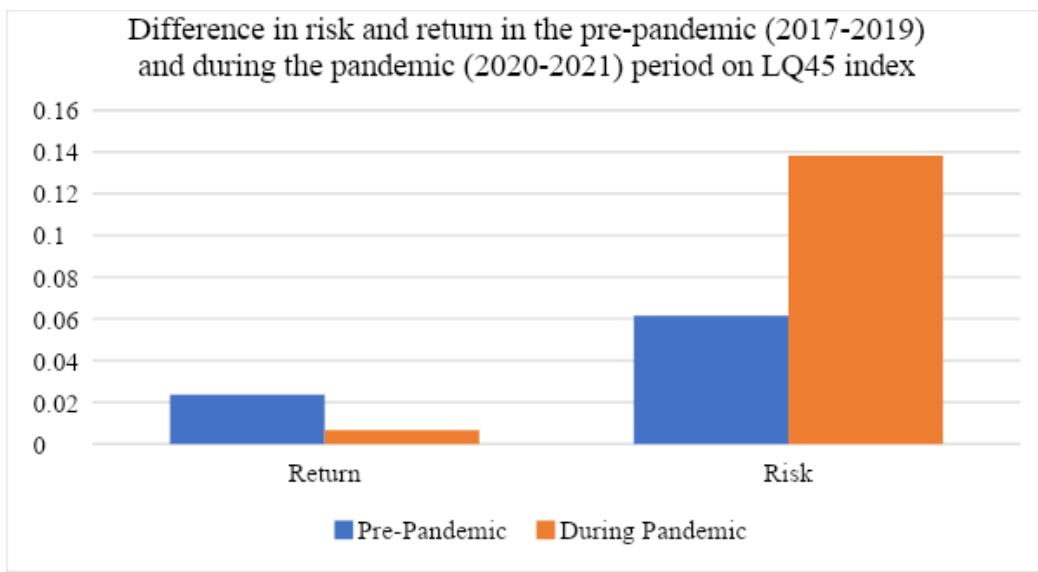
The risk or standard deviation of LQ45 in 2020 is 0.17236 or 17.236%, obtained with a variance 0.030 or 3%. The lowest value of monthly return that appears most often is minus 51%. Biggest return achieved in 2020 is 64% and lowest return achieved in 2020 is minus 51%. The middle number or median from the data is 0.0149 or 1.49%. The first quartile (Q_1) and third quartile (Q_3) from the data is -0.0786 (-7.86%) and 0.0956 (9.56%).

The statistical dispersion or interquartile range of the data is 0.17. The 2021 return data consists of 60 monthly BBCA, BBNI, BBRI, BBTN, and BMRI stock returns in 2021. Using SPSS, it is known that the average return of LQ45 in 2021 is 0.0083 or 0.83%. The risk or standard deviation of LQ45 in 2021 is 0.09368 or 9.368%, obtained with a variance 0.009 or 0.9%. The lowest value of monthly return that appears most often is minus 17%. Biggest return achieved in 2021 is 32% and lowest return achieved in 2021 is minus 17%. The middle number or median from the data is minus 0.0045 or -0.45%. The first quartile (Q_1) and third quartile (Q_3) from the data is -0.0399 (-3.99%) and 0.0488 (4.88%). The statistical dispersion or interquartile range of the data is 0.09. The return and risk analysis results are summarized in the following chart:



To answer research questions, the data is also processed into two groups, namely the pre-pandemic period 2017 - 2019 and during the pandemic 2020 - 2021. The pre-pandemic return data consists of 180 monthly BBCA, BBNI, BBRI, BBTN, and BMRI stock returns in 2017-2019. Using SPSS, it is known that the average return of LQ45 in 2017-2019 is 0.0237 or 2.37%. The risk or standard deviation of LQ45 in 2017-2019 is 0.06139 or 6.139%, obtained with a variance 0.004 or 0.4%. The monthly return that appears most often is 0.00. Biggest return achieved in 2017-2019 is 22% and lowest return achieved in 2017-2019 is minus 19%. The middle number or median from the data is 0.0269 or 2.69%. The first quartile (Q_1) and third quartile (Q_3) from the data is minus 0.007 (-0.7%) and 0.0634 (6.34%). The statistical dispersion or interquartile range of the data is 0.07.

During the pandemic return data consists of 120 monthly BBCA, BBNI, BBRI, BBTN, and BMRI stock returns in 2020-2021. Using SPSS, it is known that the average return of LQ45 in 2020-2021 is 0.0065 or 0.65%. The risk or standard deviation of LQ45 in 2020-2021 is 0.13814 or 13.814%, obtained with a variance 0.019 or 1.9%. The monthly return that appears most often is 0.00. Biggest return achieved in 2020-2021 is 64% and lowest return achieved in 2020-2021 is minus 51%. The middle number or median from the data is 0.0029 or 0.29%. The first quartile (Q_1) and third quartile (Q_3) from the data is minus 0.0575 (-5.75%) and 0.0713 (7.13%). The statistical dispersion or interquartile range of the data is 0.13. The return and risk analysis results are summarized in the following chart:



4. CONCLUSION

It can be summarized that in the time of pre-pandemic (2017-2019) and during pandemic (2020-2021), LQ45 index has no change in stock performance qualitatively. Meanwhile quantitatively, there's a decrease in return of LQ45 index from 2.37% in pre-pandemic by 72.57% to 0.65% return during pandemic. There's also a 125.02% increase in LQ45 index risk, which from 6.139% in pre-pandemic and 13.814% during pandemic.

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CASE STUDY 5.

AN ANALYSIS OF THE EFFECT OF ONLINE GAME TO THE TEENAGER

1. Motivation

1.1 Background

Teenagers are a transition period from the beginning of children to the beginning of adulthood, which is entered at the age of about 10 to 12 years and ends at the age of 18 years to 22 years. Teen age is an unstable age or easily influenced by the surrounding environment. This is influenced by high curiosity and influence between fellow teenagers and the surrounding environment.

In the age of rapid technological development many people created new technologies such as cellphones, laptops, tv, and others. This technology is very useful to facilitate human work. An example is the google application where we can find information that we do not know.

In addition, many people misuse the technology. An example is Google. Besides being useful for finding information and adding our insights, it can be misused to open pornographic sites.

Due to the unstable nature of adolescents and easily influenced by the surrounding environment, technology will have a major impact on adolescent behavior. These impacts are positive and negative. Therefore, it is necessary to supervise the use of these technologies.

Besides aiming to simplify work, technology can be a means of entertainment. For example video games that are very popular with teenagers. Video games are games with modern technology. Excessive use of games can affect learning time, health, safety of

players and those around them. So, this article will describe the impact of games on adolescent behavior.

1.2 Objective

1. To Identify the type of data provided.
2. To analyze which has the highest frequency for knowing the effect of game online based on population and sampling.
3. To analyze the quantitative data related to scale.
4. To analyze the qualitative data related to gender, grade, and effect.
5. To analyze the data using bar chart and/or pie chart, histogram and boxplot.

1.3 Question

1. What is the type of data provided?
2. Which has the highest frequency for knowing the effect of game online based on population and sampling?
3. How to define the quantitative data related to scale?
4. How to define the qualitative data related to gender, grade, and effect?
5. How to define the data using a bar chart and/or pie chart, histogram and boxplot?

2. Method

2.1 Data

To conduct this research, all the data are taken from primary resources. We gather our data by making a questionnaire. The questionnaire we make it with Google Forms.

2.2 Sampling

The raw data and population of our research are based on 50 people who fill our google forms that we conduct. The sampling frame of our are as follows :

NO	NAME	GENDER	GRADE	SCALE	EFFECT
1.	Wildan	Male	Senior	5	Yes
2.	Jaelani	Male	Senior	5	Yes
3.	Rizky	Male	College	4	No
4.	Imran fz	Male	College	5	No
5.	Nab	Female	College	5	Yes
6.	Kiran	Female	College	4	No
7.	Ammar	Male	College	4	Yes
8.	Farrel U	Male	College	5	Yes
9.	Farid	Male	Senior	4	Yes
10.	Rahel basyarahil	Male	College	4	Yes
11.	Kamal	Male	Senior	5	Yes
12.	Saleh	Male	College	5	Yes
13.	Shayma	Female	Junior	1	No
14.	Syahira	Female	Senior	2	Yes
15.	Maicle	Male	Senior	3	Yes
16.	Fadhil	Male	Senior	3	No
17.	Naffan	Male	Senior	5	No
18.	Haidar	Male	College	4	No
19.	Samir	Male	College	5	Yes

20.	Muhammad	Male	College	5	No
21.	Rayhan	Male	College	3	No
22.	Zidan	Male	Senior	2	No
23.	Kemal	Male	College	3	No
24.	Syilvi	Female	Senior	2	No
25.	Abudi	Male	Senior	1	No
26.	Salim	Male	Senior	4	Yes
27.	Ramy Bobs	Male	College	4	Yes
28.	Sandra	Female	Junior	3	Yes
29.	Ahmad Raihan Fauzan	Male	College	5	No
30.	Fajar	Male	Senior	1	Yes
31.	Akmal	Male	College	5	Yes
32.	Minda	Female	College	3	No
33.	Rara	Female	Senior	4	Yes
34.	Nindita	Female	College	3	No
35.	Diva	Female	College	3	Yes
36.	Azia Rania	Female	College	2	No
37.	Icha	Female	College	2	No
38.	Putti	Female	College	5	No
39.	Dinda	Female	College	1	No

40.	Dels	Female	College	3	Yes
41.	Thia Kirana	Female	College	5	Yes
42.	Eurika	Female	College	1	Yes
43.	Mayang	Female	College	2	Yes
44.	Mia	Female	College	4	No
45.	Audi	Female	College	5	Yes
46.	Nadya	Female	College	3	Yes
47.	Dika	Male	College	3	No
48.	Asha	Female	College	1	No
49.	Saskia	Female	College	3	No
50.	Luna	Female	College	3	No

In this research, we use a stratified random sampling technique to collect the data sample by dividing the population into gender (male and female), grade (junior, senior, & collage), and effect (yes or no).

NAME
Wildan
Imran fz
Kiran
Farrel U
Syahira
Naffan
Muhammad
Kemal
Ramy Bobs
Sandra
Nindita
Dinda
Thia Kirana
Mayang
Saskia

3. Mechanics

3.1 Qualitative Data

Gender	Frequency
Male	26
Female	24
Grade	Frequency
Junior	2
Senior	14
College	34
Effect	Frequency
Yes	25
No	25

In researching the effect of online games for our research. Nominal data was used in this research whereas nominal data for the effect of online games Gender, Grade and Effect.

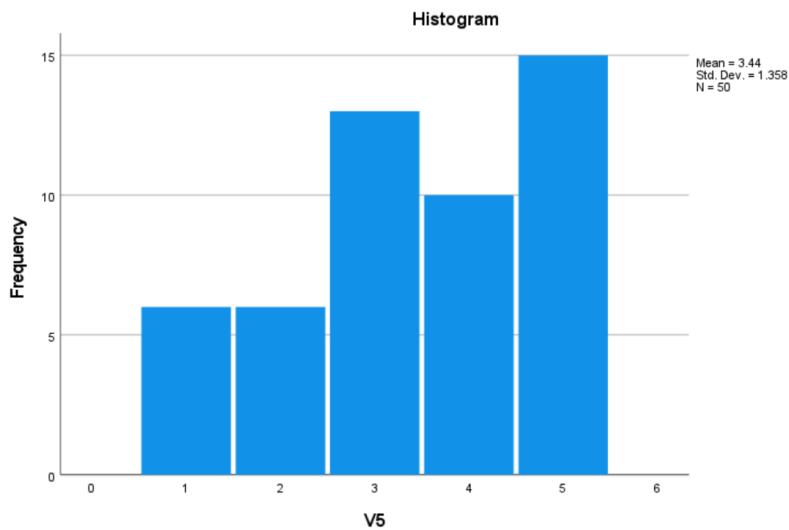
As the data are shown above. The population's frequency is based on the fifty lists of the effects of game online we collect; There are twenty six Male and twenty four Females. Furthermore, based on the data we collected, there are two from junior high school, fourteen from senior high school and the last from college students there are thirty four participants. And for the effect after playing online games twenty five participants answer yes and twenty five participants answer no.

3.2 Quantitative Data

In this research, there is one quantitative variable. There are a number of scales that we use to calculate the Quantitative. Scale is an important data to find out the effect of the online games that teenagers played. So that factor could be used to conduct the level of effectiveness of the teenagers whether he/she is having changes in their behavior after playing online games.

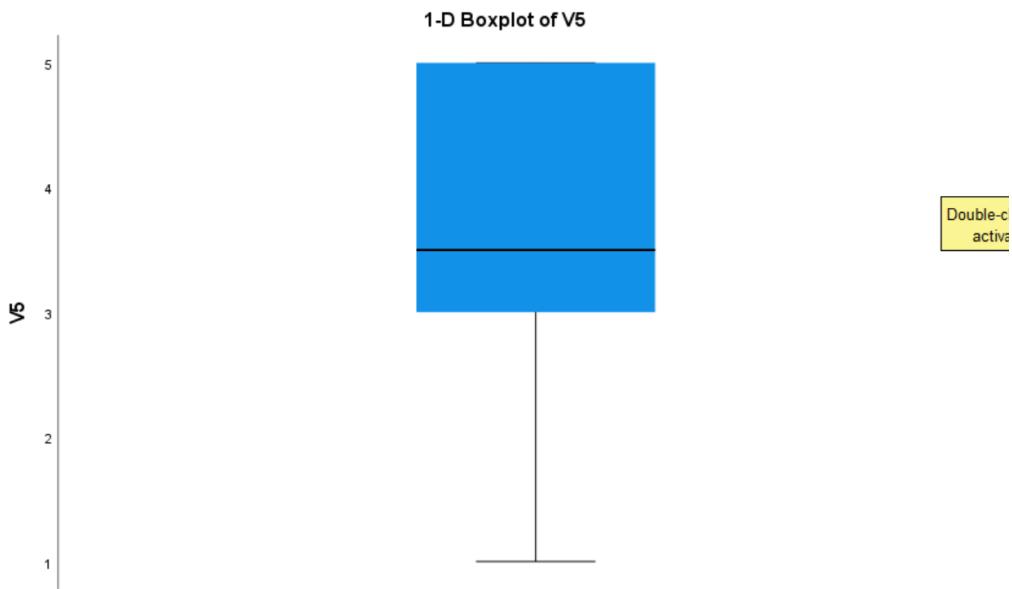
First of all we will discuss population, from the data that we collect, the average of people who often play games is 3.44, the most frequently occurring data is 5 and the median for this is 3.5. The interquartile of the population data is 2 with high number of variances and standard deviation is (1.358 and 1.843)

Histogram (Population)



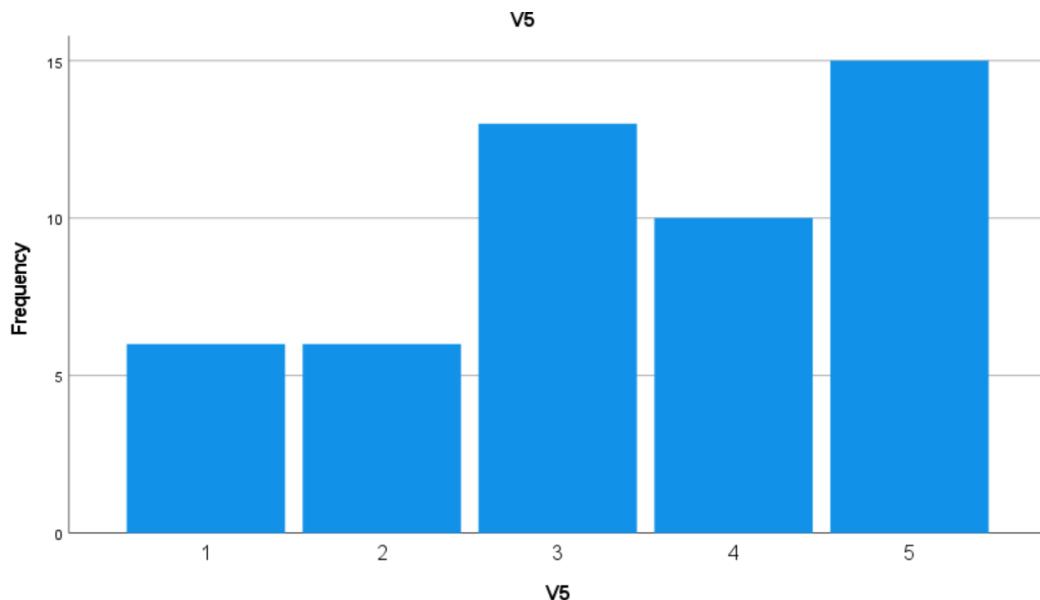
From the histogram above, we can see that most of the population data is 5 are in first and second is 3 which is 13 of the participants.

Boxplot (Population)



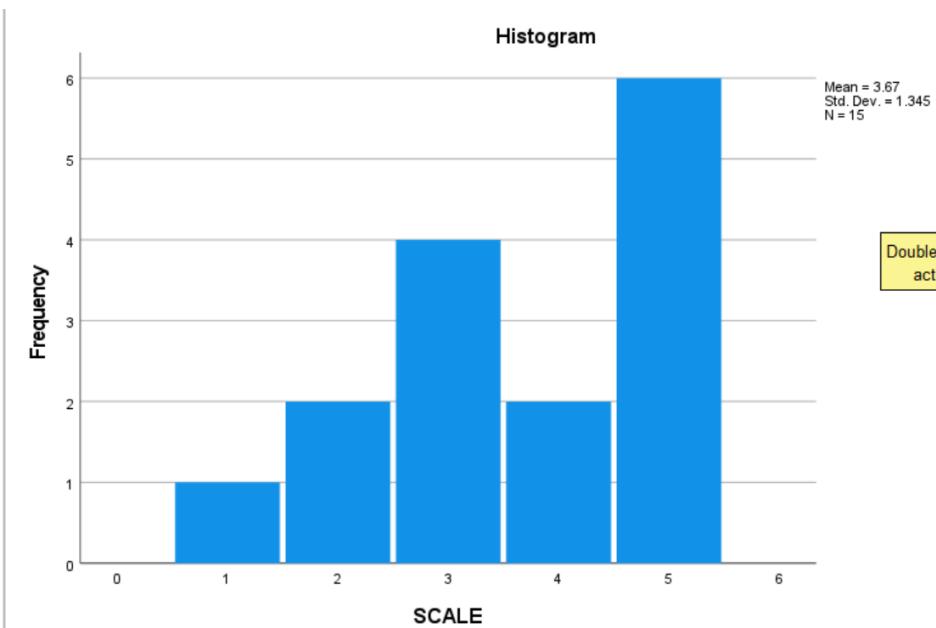
From the boxplot above, we can see that there are some data which are inside of most data collections or placed in blue squares.

Bar chart (Population)



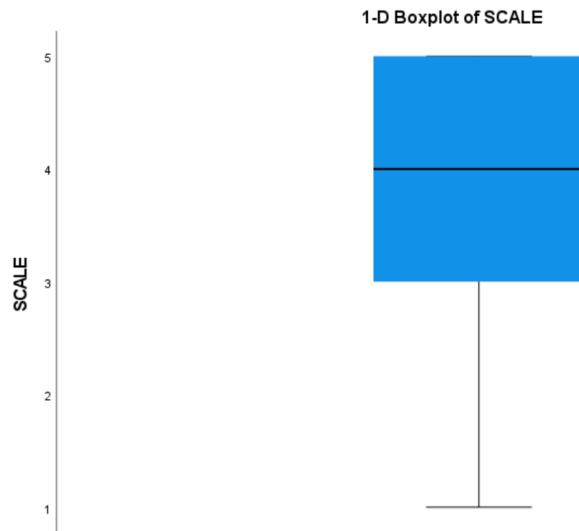
Starting from this paragraph, we would like to explain further about our data sample. We took 15 out of 50 participants for our research sample.

Histogram(Sample)



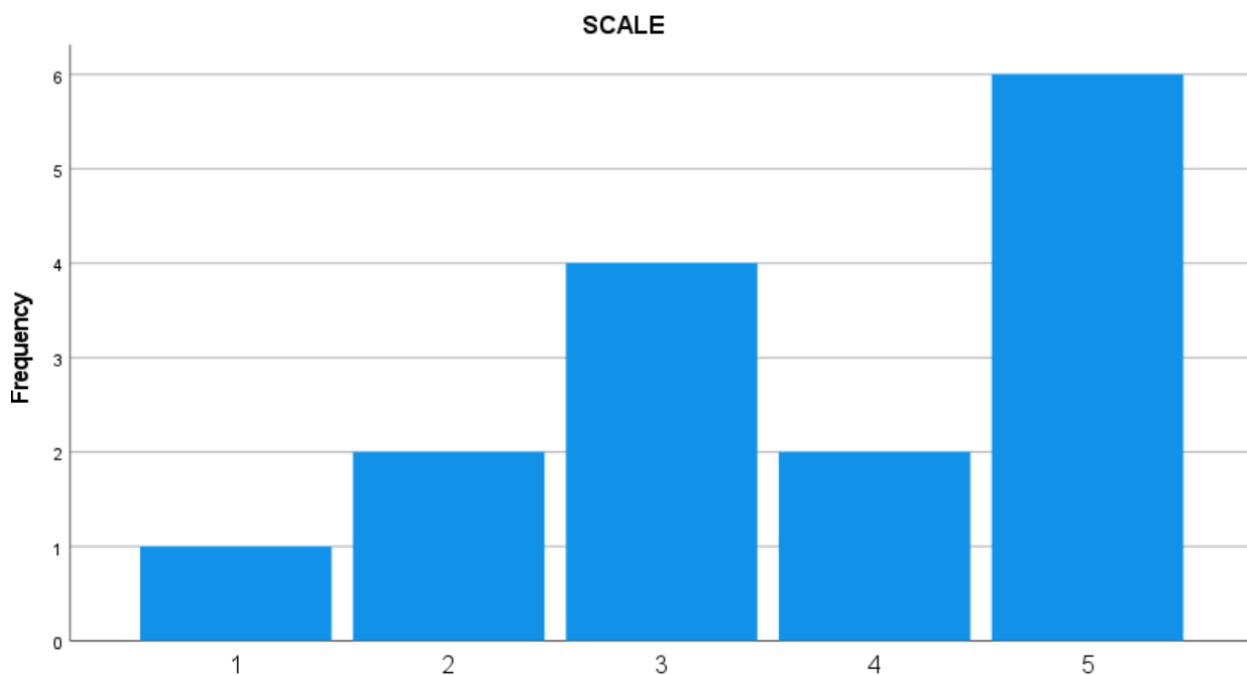
Still not that different from histogram on population, from the histogram above we can see that most of the data sample is in the scale of 5 which indicates the sample participants are still often playing online games.

Boxplot (Sample)



In our boxplot sample the data is still not much different from the boxplot population.

Bar chart (Sample)



In this bar chart, the highest number of data is 5 with a total of 6 participants. Whereas, 1 has the lowest number of data with only 1 participant.

4. Message

The conclusion we got after doing this research is that we found that half of the participants said that after playing the game they felt a change within themselves. But the other half of the participants said the opposite. They said that after playing the game, there was no change in themselves.

CASE STUDY 6.

THE PANDEMIC EFFECT ON THE SUB-SAHARAN AFRICA INTERNATIONAL TOURISM, BY THE NUMBER OF ARRIVALS AND RECEIPTS (CURRENT US\$) IN 2018-2020

1. Motivation

1.1 Background

Commonly seen as a third-world country, contrary to popular beliefs and cinematic depictions, Africa is home to many major tourist attractions, which include the seven wonders of the world. The tourism industry is an excellent industry in Africa, it has annual revenue of billions and provides employment to millions of people. The year was 2020, as the pandemic reached its peak, the world went into quarantine, countries and governments started to impose travel restrictions causing the tourism industry to take a huge hit. This was bad news for the African tourism industry as some part of their GDP is supported by tourism. With the help of our data, the tourism businesses in Africa can make more efficient decisions. On how to improve the tourism industry after the pandemic. Not only that but our data can also assist the government to make major decisions such as increasing or decreasing expenditure on public goods and services, and combating covid as the tourism industry rises.

1.2 Objective

1. To help in making financial decisions
2. To reach the specific target market
3. To help anticipate future demand after the pandemic

1.3 Question

1. What is the income rate of the country? (ordinal)

1.1 Low income

- 1.2 Lower middle income
 - 1.3 Middle income
 - 1.4 Upper middle income
 - 1.5 High income
- 2. What is the number of arrivals in the country in the year 2018? (nominal)
 - 3. What is the number of arrivals in the country in the year 2019? (nominal)
 - 4. What is the number of arrivals in the country in the year 2020? (nominal)
 - 5. What is the number of receipts in the country in the year 2018? (nominal)
 - 6. What is the number of receipts in the country in the year 2019? (nominal)
 - 7. What is the number of receipts in the country in the year 2020? (nominal)

2. Method

2.1 Data

The data was collected via the World Bank, which makes our data secondary data. We collected the data on the arrivals and receipts of the 13 Sub-Saharan African countries from the year 2018 to the year 2020.

2.2 Sampling

The data and population are found through the number of visitors, which includes tourists, same-day visitors, cruise passengers, and crew members. The data is obtained from border statistics (police, immigration, and the like) and supplemented by border surveys. As for the international tourism receipts, payments to national carriers for international transport. These receipts include any other prepayment made for goods or services received in the destination country. The receipts data are in current U.S. dollars.

In this research, we used cluster sampling, in which we took 13 countries from Africa. Each country is already a cluster. We used single-stage cluster sampling where all countries have chosen are part of our research. We categorize tourism into two sections, which are arrivals and receipts, then we take samples from all the 13 countries for both the categories and the confidence interval of our research is 95%. The table is shown on the next page.

No	Country	Income Rate	Number of Arrivals, 2018	Number of Arrivals, 2019	Number of Arrivals, 2020	Receipts (current US\$), 2018	Receipts (current US\$), 2018	Receipts (current US\$), 2020
1	Côte d'Ivoire	Lower middle income	1,965,000	2,070,000	668,000	551,000,000	550,500,000	199,300,003
2	Comoros	Lower middle income	35,900	45,100	7,000	73,699,997	72,699,997	18,500,000
3	Cabo Verde	Lower middle income	710,000	758,000	180,000	520,000,000	567,000,000	169,000,000
4	Ethiopia	Low income	849,000	812,000	518,000	3,548,000,000	3,529,000,000	2,282,000,000
5	Gambia, The	Low income	552,000	620,000	246,000	174,000,000	157,000,000	53,000,000
6	Madagascar	Low income	360,000	486,000	87,100	879,000,000	951,000,000	202,000,000
7	Mauritius	Upper middle income	1,431,000	1,418,000	316,000	2,161,000,000	2,024,000,000	518,000,000
8	Namibia	Upper middle income	1,639,000	1,651,000	187,100	488,000,000	451,000,000	155,000,000
9	Eswatini	Lower middle income	1,277,000	1,226,000	345,300	16,400,000	14,300,000	7,300,000
10	Seychelles	High income	405,000	428,000	124,500	611,000,000	618,000,000	228,000,000
11	Uganda	Low income	1,506,000	1,543,000	473,000	1,522,000,000	1,400,000,000	518,000,000
12	South Africa	Upper middle income	15,004,000	14,797,000	3,886,600	9,789,000,000	9,064,000,000	2,716,000,000
13	Zimbabwe	Lower middle income	2,580,000	2,294,000	639,000	191,000,000	285,000,000	66,000,000

3. Mechanics

There are 4 types of data scales: nominal, ordinal, interval, or ratio. Nominal scales are used for labeling variables, without any quantitative value. Examples of nominal scales are age, gender, and race. With ordinal scales, the order of the values is what's important and significant, but the differences between each one are not really known. Ordinal scales are typically measures of non-numeric concepts like satisfaction, happiness, and discomfort. Interval scales are numeric scales in which we know both the order and the exact differences between the values. The classic example of an interval scale is Celsius temperature. Everything about interval data applies to ratio scales, plus ratio scales have a clear definition of zero. Good examples of ratio variables include height, weight, and duration.

In this scenario, the income rate is classified as nominal data; and the number of arrivals in 2018, the number of arrivals in 2019, the number of arrivals in 2020, the number of receipts in 2018, the number of receipts in 2019, the number of receipts in 2020 is classified as ordinal data.

3.1 Qualitative data

For our research on Sub-Saharan Africa's international tourism, the qualitative data is the income rate. As seen below, the income rate is divided into 5 categories, namely low income, lower middle income, middle income, upper middle income, and high income. We choose income rate as this plays an important role in tourism and travel. By using SPSS, we can come up with the frequency table and chart. We can see that this category has a different cumulative percentage. The highest frequency consists of lower middle income. Which have a frequency of 5 and a cumulative percentage of 69.2.

Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

This screenshot shows the Variable View tab of the SPSS Data Editor. It lists 18 variables across 12 columns. The variables are:

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	IR	Numeric	8	0	Income Rate	{1, Low Inc...}	None	8	Right	Ordinal	Input
2	NA18	Numeric	8	0	Number of Ar...	None	None	8	Right	Nominal	Input
3	NA19	Numeric	8	0	Number of Ar...	None	None	8	Right	Nominal	Input
4	NA20	Numeric	8	0	Number of Ar...	None	None	8	Right	Nominal	Input
5	R18	Numeric	8	0	Receipts, 2018	None	None	10	Right	Nominal	Input
6	R19	Numeric	8	0	Receipts, 2019	None	None	10	Right	Nominal	Input
7	R20	Numeric	8	0	Receipts, 2020	None	None	10	Right	Nominal	Input
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Below the table, tabs for "Data View" and "Variable View" are visible, along with status bars indicating the processor is ready and the current encoding.

Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

This screenshot shows the Data View tab of the SPSS Data Editor. It displays 17 data rows for the variables defined in the Variable View. The data is as follows:

	IR	NA18	NA19	NA20	R18	R19	R20	var	var	var	var
1	2	1965000	2070000	668000	551000000	550500000	199300003				
2	2	35900	45100	7000	73699997	72699997	18500000				
3	2	710000	758000	180000	520000000	567000000	169000000				
4	1	849000	812000	518000	3548000000	3529000000	2282000000				
5	1	552000	620000	246000	174000000	157000000	53000000				
6	1	360000	486000	87100	879000000	951000000	202000000				
7	4	1431000	1418000	316000	2161000000	2024000000	518000000				
8	4	1639000	1651000	187100	488000000	451000000	155000000				
9	2	1277000	1226000	345300	16400000	14300000	7300000				
10	5	405000	428000	124500	611000000	618000000	228000000				
11	1	1506000	1543000	473000	1522000000	1400000000	518000000				
12	4	15004000	14797000	3886600	9789000000	9064000000	2716000000				
13	2	2580000	2294000	639000	191000000	285000000	66000000				
14											
15											
16											
17											

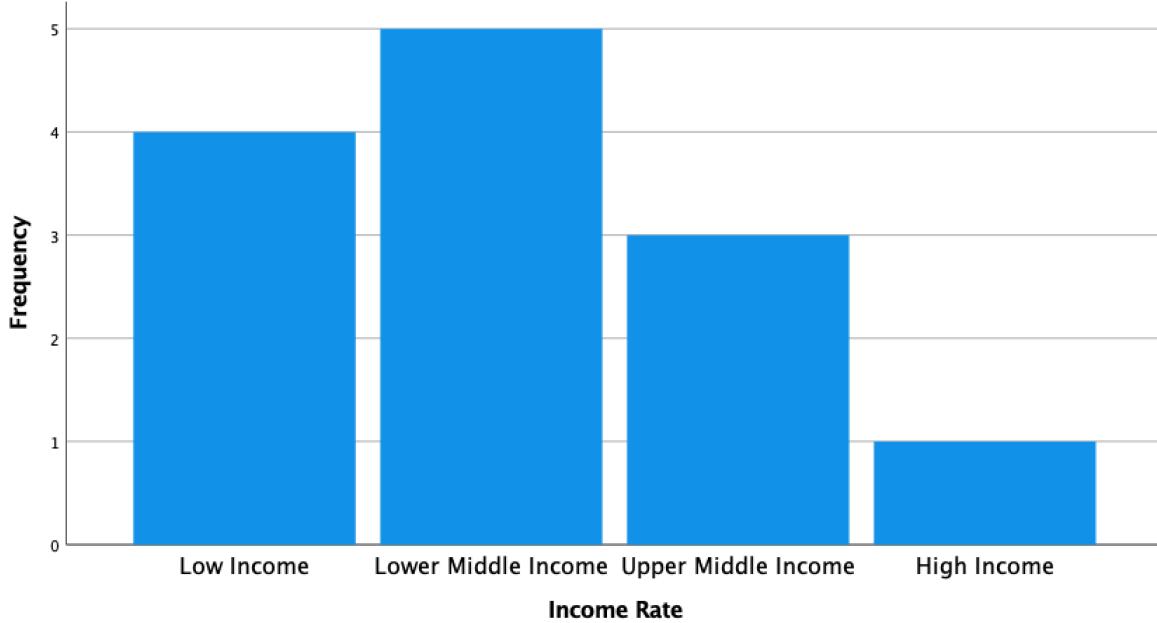
Below the table, tabs for "Data View" and "Variable View" are visible, along with status bars indicating the processor is ready and the current encoding.

Frequency Table

Income Rate

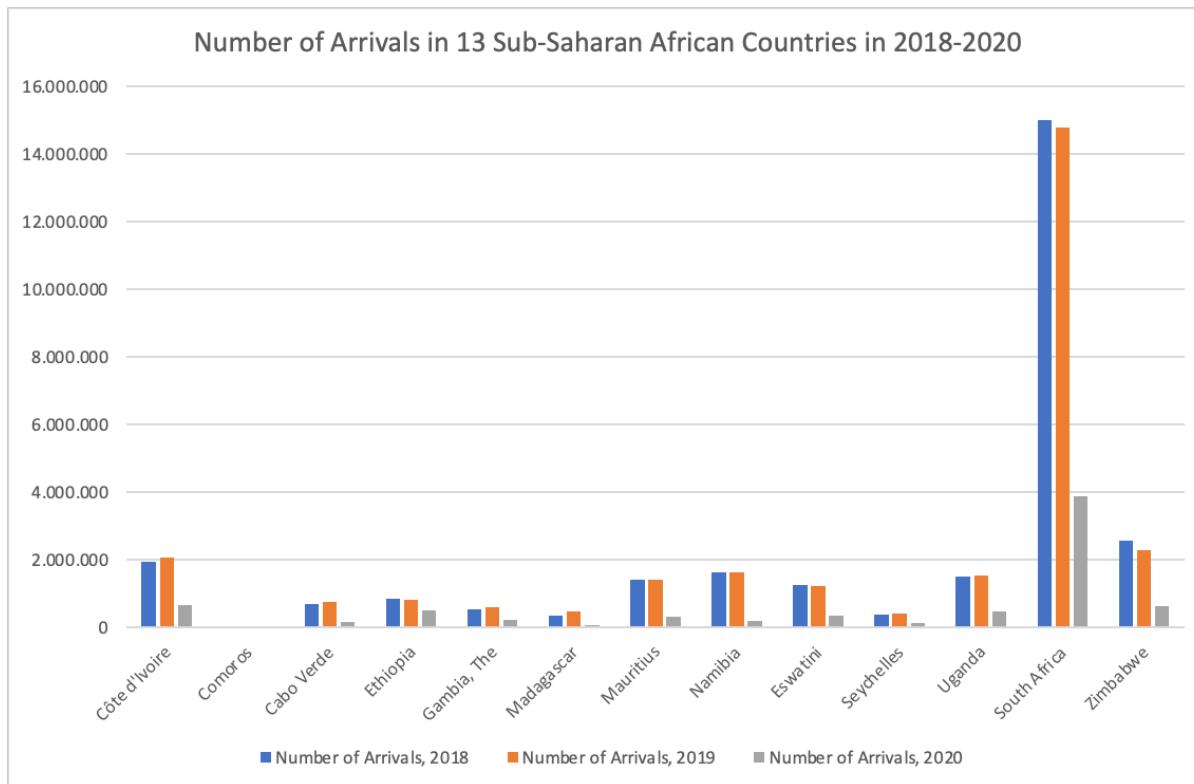
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low Income	4	30.8	30.8	30.8
	Lower Middle Income	5	38.5	38.5	69.2
	Upper Middle Income	3	23.1	23.1	92.3
	High Income	1	7.7	7.7	100.0
	Total	13	100.0	100.0	

Income Rate



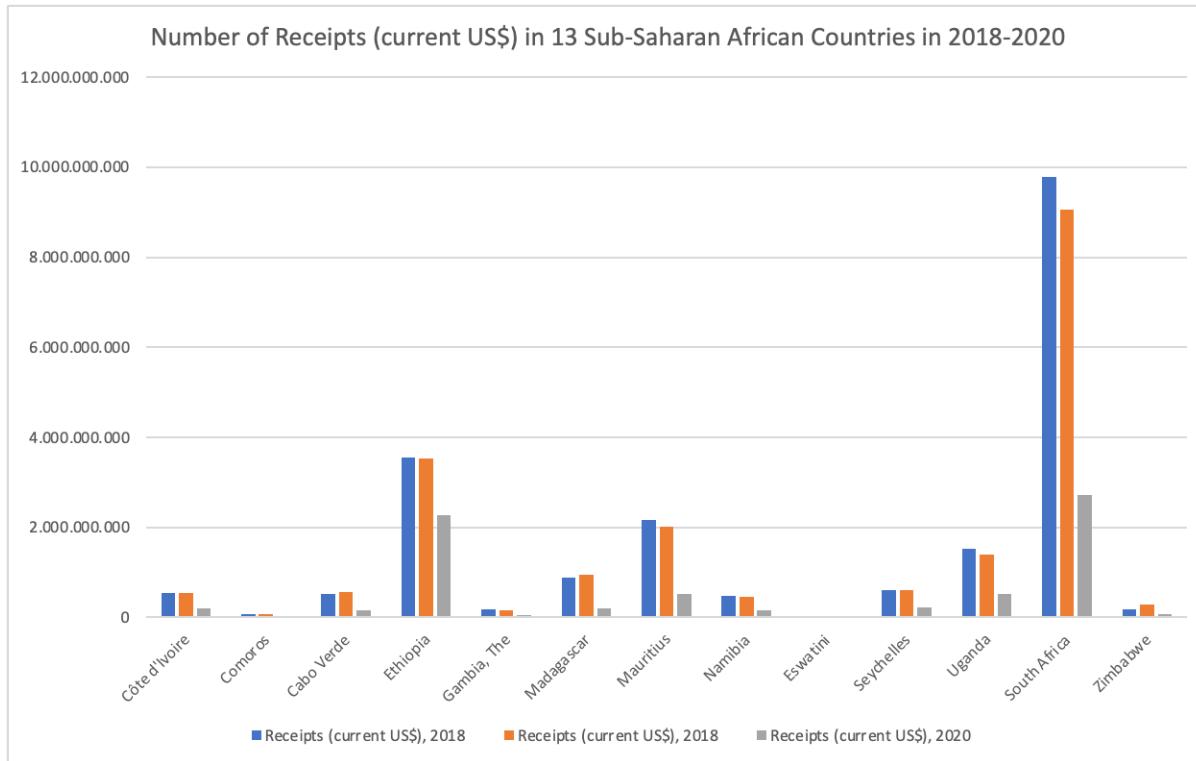
3.2 Quantitative data

Down below are the number of arrivals in the 13 Sub-Saharan African countries from the year 2018 to 2020. We can see that the most number of arrivals from all the 13 countries were in South Africa. We can observe that in the year 2018 to 2019, the number of arrivals is relatively stable, compared to some countries which experience a slight increase or decrease in arrivals but not by a huge margin. On the other hand, in 2020 there was a huge decrease in the number of arrivals. The lowest arrival seems to be in Comoros while the highest arrival is seen in South Africa. Mauritius, Namibia, and Eswatini seem to have almost an equal amount of arrivals from 2018 to 2020, which means it doesn't get as much impact from the pandemic as the other countries have faced.



Furthermore, down below is the chart that shows us the number of receipts from all 13 countries. We can see that there are three countries that stand out, namely, Ethiopia, Mauritius, and South Africa. A trend we can observe here is that during the years 2018 to 2019 the countries had a stable rate of receipts, a slight increase or decrease but only by a

small margin. In 2020 we can observe that all the countries experienced a decrease in the number of receipts. Other than Comoros which happens to have the same amount of receipts in 2020 as it did in 2019.



Statistics							
	Income Rate	Number of Arrivals, 2018	Number of Arrivals, 2019	Number of Arrivals, 2020	Receipts, 2018	Receipts, 2019	Receipts, 2020
N	Valid	13	13	13	13	13	13
	Missing	0	0	0	0	0	0
Mean		2.38	2177992.31	2165238.46	590584.62	1578776923	1514115384
Median		2.00	1277000.00	1226000.00	316000.00	551000000	567000000
Mode		2	35900 ^a	45100 ^a	7000 ^a	16400000 ^a	14300000 ^a
Std. Deviation		1.387	3920326.840	3853692.691	1011934.257	2661873075	2467945364
Variance		1.923	1.537E+13	1.485E+13	1.024E+12	7.086E+18	6.091E+18
Percentiles	25	1.00	478500.00	553000.00	152250.00	182500000	221000000
	50	2.00	1277000.00	1226000.00	316000.00	551000000	567000000
	75	4.00	1802000.00	1860500.00	578500.00	1841500000	1712000000

a. Multiple modes exist. The smallest value is shown

See the statistics in the table above. The mean is the average of the data, in our case, it shows us the average of the number of arrivals and receipts from 2018 which is 2.177.992,31 for

the arrivals and \$1.578.776.923 for the receipts, and from 2019 which is 2.165.238,46 for the arrivals and \$1.514.115.384 for the receipts; to 2020 which is 590.584,62 for the arrivals and \$548.623.077 for the receipts. We can see here that the average seems to be similar and stable in the years 2018 and 2019. Yet in the year 2020, the average for arrivals and receipts seems to have been impacted by the pandemic causing the average to decrease. The median is the middle number after the numbers have been arranged in ascending order, then the middle number is picked out. We can then see the income rate, that the median (2.00) is very similar to the mean (2.38), which means that the data has a reasonable symmetrical distribution. From 2018 to 2019, the arrivals and receipts seem to have a stable median but in the year 2020, we can see the median has decreased, this tells us that the data from the year 2019 to 2020 has an asymmetrical distribution. Standard deviation is a measure of the amount of variation or dispersion of a set of values. We can see that the data value is dispersed.

4. Message

In conclusion, tourism is a relatively booming industry, we can understand this by looking at the data from the two categories tourism is broken down into, arrival and receipts. We can observe that from the year 2018 to 2019 arrivals stayed quite stable, although countries had increased and decreased during this time, they were not significantly huge, they were different only by a small margin. In 2020, when the pandemic hit and the world went into lockdown, we can observe the number of arrivals drastically decreased as travel bans started to get imposed. Similarly, we can see, for the receipts, from the year 2018 to 2019 there were stable receipts with some marginal differences in the countries but not a huge increase or decrease. Our data can help companies and the government to make certain decisions in the tourism industry after the pandemic.

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CASE STUDY 7.

LIP PRODUCT IN INDONESIA

1. Motivation

1.2 Background

You may not realize that there are several new and various cosmetics to color and beautify your lips if you've been devoted to the same lipstick brand and hue for the last decade or more. You can alter your look by wearing any of the different lip color options alone or stacked together. "There are no right or wrong guidelines when it comes to lip color," said Clarissa Luna, a celebrity makeup artist in New York. "You should be using whatever you're most comfortable with. However, before you decide what lip color to choose, think about your lips' health. Because the lips can acquire skin cancer, Ellen Marmur, MD, associate professor of dermatology at Mount Sinai Medical Center in New York, recommends that you protect these sensitive parts from the sun. Use a lip-friendly sunscreen or search for lip color with at least SPF 15 protection. Therefore, Lip products are one of the most important parts of makeup. It is even considered as the most used beauty product in the world. Without using lip products it will make the face become pale. There are a lot of types of Lip products brands in indonesia.

For these several reasons, we would like to analyze the specification of the Lip products that are available in Indonesia's shade, brands, type and the prices that they are offering.

1.2 Objective

This research aims to determine several indicators of lip products in Indonesia based on population and sample gathered from secondary data which are:

1. To identify the type of data provided for lip product
2. To identify the average price of a popular lip product in Indonesia
3. To identify the famous brand of lip product in Indonesia
4. To Identify the shades that are available for lip product in average
5. To Identify the common type of lip product in Indonesia

1.3 Question

1. What is the type of data provided?
2. What is the average price of a popular lip product in Indonesia?
3. What is a famous brand for lip products?
4. How many shades are available for some lip products on average?
5. What is the common type of lip product in Indonesia?

2. Method

2.1 Data

From Cambridge Dictionary, data is information, especially facts or numbers, collected to be examined and considered and used to help decision-making, or information in an electronic form that can be stored and used by a computer. There are two ways to collect data which are primary (direct) and secondary (indirect). Wagh. S (2022) stated that primary data is data generated by the researcher, such as surveys, interviews, and experimental research, which are specifically designed to help the researcher understand and in order to address the research source of the problem. Whereas secondary data is data which has already been managed to gather for another purpose (Allen. M, 2017). For instance, the data from World Bank, Government, journal, etc.

On this occasion, secondary data is a method that is used for collecting the data since this research needs to be valid and wide that can't be obtained by using direct methods that surely will consume plenty of time and cost. There are a lot of resources available but this research needs credibility and objectivity.

There are several benefit by using secondary data, which are

1. It is cost-effective. It saves both time and money.
2. It saves you time.
3. It aids in making primary data collection more specific because secondary data allows us to identify gaps and deficiencies, as well as what additional information needs to be collected.
4. It contributes to a better understanding of the problem.
5. It serves as a foundation for comparing the data gathered by the researcher.

However, there is also disadvantages of using secondary data, which are

1. Secondary data rarely fits within the framework of marketing research factors.
2. The precision of secondary data is unknown.
3. Data may be out of date.

In this case, to minimize time spending, secondary data is used as the resources since there are millions of lip products in Indonesia. My-best.id website is a website that provides information about recommended products. With My-best.id, people can easily find the best goods in some country without analyzing it one by one since it also provides a comparison table. However, to avoid irrelevant data, gaining some primary data from official websites is used to ensure that the data is credible and valid. Below is the table showing the population.

Lip Product	Brand	Type of Lip Product	Shades	Price
NIVEA LIP BALM SOOTHE & PROTECT	Beiersdorf	Stick	1	29000
Extra lip tint	Bobbi Brown	Stick	7	345000

Perfect Matte Lip Coat	Dear Me Beauty	Liquid	6	129000
Creamytint	Emina	Liquid	5	44000
magic potion lip tint	Emina	Liquid	6	46000
Squeeze me up Lip Matte	Emina	Liquid	4	53500
Smoochies Lip balm	Emina	Solid	2	30500
Matte Lip Liquid	ESQA	Liquid	7	165000
Dear Darling Water gel tint	Etude House	Liquid	10	35000
Organic lip balm	Eucalie	Stick	1	79000
lip and cheek dual use liquid	Focallure	Liquid	7	129045
Melted Matte Lip	Goban Cosmetics	Liquid	5	78000
Sheen. Tinted lip balm + UV filter	HALE.	Stick	3	98000
Urban Lip Cream Matte	Implora	Liquid	12	24000
Beauty Lip & Cheeck Crayon	Indoganic	Crayon	3	129000
Vivid oil tint	Innisfree	Liquid	10	150000
Metallic Lip Cream	Inul Beauty	Liquid	4	89000
Infalible Pro Matte Lip Liquid	L'oreal	Liquid	4	150000
Rouge Signature Liquid Matte Lipstick	L'oreal	Liquid	10	150000
Color Riche Matte	L'oreal	Stick	45	75000
Intense Matte Lip Cream	Liquid	Liquid	12	110000
Longlasting Matte Lip Cream Metalic	LT Pro	Liquid	3	97500
Ultra Light Lip Stain	Luxcrime	Liquid	5	109000
Airy lip mousse	Luxcrime	Liquid	8	109000
Dew tinted 6hr lip moisturizer	Mad for Makeup	Stick	3	99000
magnifique lip tint	Madame Gie	Liquid	8	23000
Brilliant Glaze Lip Liquide	Madame Gie	Liquid	5	27000
Moist Velvet & Smooth Lip Liquide	Madame Gie	Liquid	6	30000

Hydrastay lip whip	Makeover	liquid	12	105000
Powestay Transfer Proof Matte Lip Cream	Makeover	Liquid	8	123000
Sensational Liquid Matte	Maybelline	Liquid	10	69000
color sensational lip tint	Maybelline	Liquid	5	119000
Super Stay Matte Ink	Maybelline	Liquid	44	125000
Color sensational the powder mattes	Maybelline	stick	24	55000
Hydra Lip Cheek Tint	Mineral Botanica	Liquid	4	51900
the one A-Z lip balm SPF 25	Oriflame	Stick	2	139000
Lip Cream	PIXY	Liquid	16	53700
2 in 1 color tint	Purbasari	Liquid	3	38500
Lip Cream Series	Raiku	Liquid	13	118000
SUEDED! Lip & Cheek Cream	Rollover Reaction	liquid	12	129000
Juicy Lip Balm	Rose All day	Stick	4	139000
Lip Color	Runa Beauty	Stick	5	138000
Lip Care	Sensatia Botanica	Liquid	4	60000
Coconut lip sleeping balm	Tiff Body	Liquid	1	69000
delight tony tint	Tony Moly	Liquid	3	28000
Exclusive Matte Lip Cream	Wardah	Liquid	20	62000
Colorfit Velvet Matte Lip Mousse	Wardah	Liquid	14	73000
Everyday Moisture Lip nutrition	Wardah	Stick	2	27000
Color Fit Ultralight Matte	Wardah	stick	5	43000
The Simplicity Love You tint	Y.O.U	Liquid	6	45000

2.2 Sampling

Momoh.O (2021) stated that a population is a distinguishable group of people, whether that group is a nation or group of people who represent a characteristic. In this research the population is all the population data of popular lip products in Indonesia including several types. Whereas sampling is a technique for selecting individual members or a subset of the population in order to make statistical inferences and estimate population characteristics. From the population of 50 lip products, divided by five variables which are lip product, brand, type, shades and price. There are four methods of sampling which are random, stratified, systematic and cluster sampling. Stratified sampling method is used to determine the sample in this research by dividing the population into subgroups based on the brand. There are 35 data collections for samples.

The confidence interval is 95% with level of significance one-tailed test is 0,025 and level of significance two-tailed test is 0,05. Below is the table showing the sample.

Lip Product	Brand	Type of Lip Product	Shades	Price
NIVEA LIP BALM SOOTHE & PRTECT	Beiersdorf	Stick	1	29000
Extra lip tint	Bobbi Brown	Stick	7	345000
Perfect Matte Lip Coat	Dear Me Beauty	Liquid	6	129000
Creamytint	Emina	Liquid	5	44000
Matte Lip Liquid	ESQA	Liquid	7	165000
Dear Darling Water gel tint	Etude House	Liquid	10	35000
Organic lip balm	Eucalie	Stick	1	79000
lip and cheek dual use liquid	Focallure	Liquid	7	129045
Melted Matte Lip	Goban Cosmetics	Liquid	5	78000
Sheen. Tinted lip balm + UV filter	HALE.	Stick	3	98000
Urban Lip Cream Matte	Implora	Liquid	12	24000

Beauty Lip & Cheeck Crayon	Indoganic	Crayon	3	129000
Vivid oil tint	Innisfree	Liquid	10	150000
Metallic Lip Cream	Inul Beauty	Liquid	4	89000
Infalible Pro Matte Lip Liquid	L'oreal	Liquid	4	150000
Intense Matte Lip Cream	Liquid	Liquid	12	110000
Longlasting Matte Lip Cream Metalic	LT Pro	Liquid	3	97500
Ultra Light Lip Stain	Luxcrime	Liquid	5	109000
Dew tinted 6hr lip moisturizer	Mad for Makeup	Stick	3	99000
magnifique lip tint	Madame Gie	Liquid	8	23000
Powestay Transfer Proof Matte Lip Cream	Makeover	Liquid	8	123000
Sensational Liquid Matte	Maybelline	Liquid	10	69000
Hydra Lip Cheek Tint	Mineral Botanica	Liquid	4	51900
the one A-Z lip balm SPF 25	Oriflame	Stick	2	139000
Lip Cream	PIXY	Liquid	16	53700
2 in 1 color tint	Purbasari	Liquid	3	38500

Lip Cream Series	Raiku	Liquid	13	118000
SUEDED! Lip & Cheek Cream	Rollover Reaction	liquid	12	129000
Juicy Lip Balm	Rose All day	Stick	4	139000
Lip Color	Runa Beauty	Stick	5	138000
Lip Care	Sensatia Botanica	Liquid	4	60000
Coconut lip sleeping balm	Tiff Body	Liquid	1	69000
delight tony tint	Tony Moly	Liquid	3	28000
Exclusive Matte Lip Cream	Wardah	Liquid	20	62000
The Simplicity Love You tint	Y.O.U	Liquid	6	45000

3. Mechanics

3.1 Qualitative data

Ivan.S (2021) stated that the descriptive and conceptual findings gathered through questionnaires, interviews, or observation are referred to as qualitative data. Researchers can explore ideas and further explain quantitative results by analyzing qualitative data. Qualitative information such as in-depth interview transcripts, diaries, anthropological field notes, answers to open-ended survey questions, audio-visual recordings, and images are examples of qualitative data. There are several type of qualitative data which are:

1. Nominal Data

Data that name by categories without implying order (categorical)

2. Ordinal Data

Data that name by categories can be ordered (categorical)

3. Interval Data

Data numerical that can be added or subtracted (no absolute zero) / Scale

4. Ratio Data

numerical values that can be added, subtracted, multiplied or divided (makes ratio comparisons possible)

In this research, the qualitative data that is used is nominal data since it can categories without necessarily implying order. Moreover, frequency tables and charts assist the data to be easier to understand.

Population

Statistics		Lip_Product	Brand	Type
N	Valid	50	50	50
	Missing	0	0	0

Lip_Product	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	2 in 1 color tint	1	2.0	2.0	2.0
	Airy lip mousse	1	2.0	2.0	4.0
	Beauty Lip & Cheeck Crayon	1	2.0	2.0	6.0
	Brilliant Glaze Lip Liquide	1	2.0	2.0	8.0
	Brilliant Moist Velvet & Smooth Lip Liquide	1	2.0	2.0	10.0
	Coconut lip sleeping balm	1	2.0	2.0	12.0
	Color Fit Ultralight Matte	1	2.0	2.0	14.0
	Color Riche Matte	1	2.0	2.0	16.0
	color sensational lip tint	1	2.0	2.0	18.0
	Color sensational the powder mattes	1	2.0	2.0	20.0

	Colorfit Velvet Matte Lip Mouse	1	2.0	2.0	22.0
	Creamytint	1	2.0	2.0	24.0
	Dear Darling Water gel tint	1	2.0	2.0	26.0
	delight tony tint	1	2.0	2.0	28.0
	Dew tinted 6hr lip moisturizer	1	2.0	2.0	30.0
	Everyday Moisture Lip nutrition	1	2.0	2.0	32.0
	Exclusive Matte Lip Cream	1	2.0	2.0	34.0
	Extra lip tint	1	2.0	2.0	36.0

	Hydra Lip Cheek Tint	1	2.0	2.0	38.0
	Hydrastay lip whip	1	2.0	2.0	40.0
	Infalible Pro Matte Lip Liquid	1	2.0	2.0	42.0
	Intense Matte Lip Cream	1	2.0	2.0	44.0
	Juicy Lip Balm	1	2.0	2.0	46.0
	lip and cheek dual use liquid	1	2.0	2.0	48.0
	Lip Care	1	2.0	2.0	50.0
	Lip Color	1	2.0	2.0	52.0
	Lip Cream	1	2.0	2.0	54.0
	Lip Cream Series	1	2.0	2.0	56.0
	Longlasting Matte Lip Cream Metalic	1	2.0	2.0	58.0
	magic potion lip tint	1	2.0	2.0	60.0
	magnifique lip tint	1	2.0	2.0	62.0
	Matte Lip Liquid	1	2.0	2.0	64.0
	Melted	1	2.0	2.0	66.0

	Matte Lip					
	Metallic Lip Cream	1	2.0	2.0	68.0	
	NIVEA LIP BALM SOOTHE & PRTECT	1	2.0	2.0	70.0	
	Organic lip balm	1	2.0	2.0	72.0	
	Perfect Matte Lip Coat	1	2.0	2.0	74.0	
	Powestay Transfer Proof Matte Lip Cream	1	2.0	2.0	76.0	
	Rouge Signature Liquid Matte Lipstick	1	2.0	2.0	78.0	

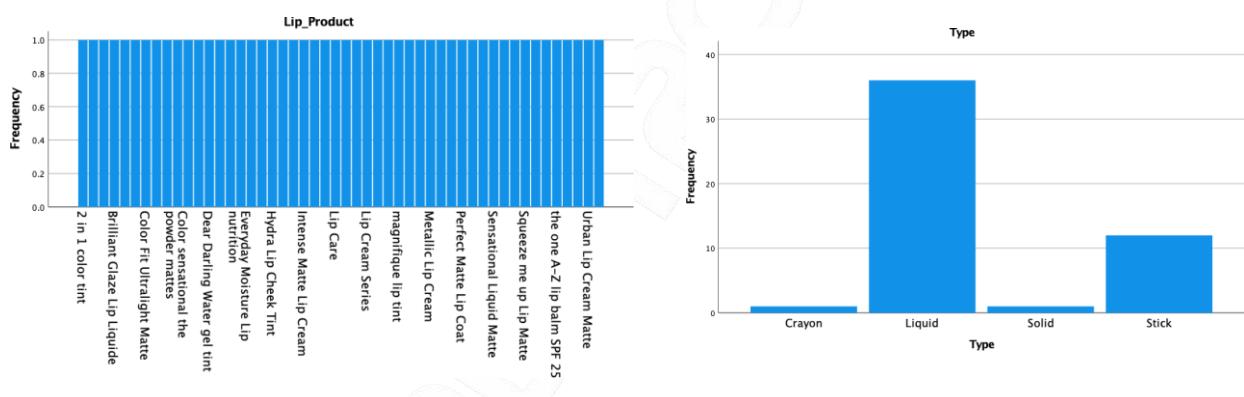
	Sensational Liquid Matte	1	2.0	2.0	80.0
	Sheen. Tinted lip balm + UV filter	1	2.0	2.0	82.0
	Smoochies Lip balm	1	2.0	2.0	84.0
	Squeeze me up Lip Matte	1	2.0	2.0	86.0
	SUEDED! Lip & Cheek Cream	1	2.0	2.0	88.0
	SuperStay Matte Ink	1	2.0	2.0	90.0
	the one A-Z lip balm SPF 25	1	2.0	2.0	92.0
	The Simplicity Love You tint	1	2.0	2.0	94.0
	Ultra Light Lip Stain	1	2.0	2.0	96.0
	Urban Lip Cream Matte	1	2.0	2.0	98.0
	Vivid oil tint	1	2.0	2.0	100. 0
	Total	50	100.0	100.0	

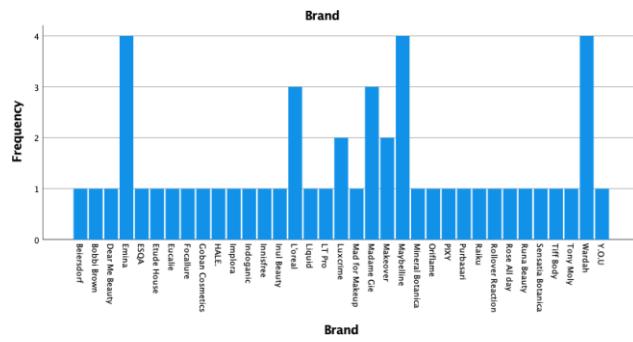
Brand		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Beiersdorf	1		2.0	2.0	2.0
	Bobbi Brown	1		2.0	2.0	4.0
	Dear Me Beauty	1		2.0	2.0	6.0
	Emina	4		8.0	8.0	14.0
	ESQA	1		2.0	2.0	16.0
	Etude House	1		2.0	2.0	18.0
	Eucalie	1		2.0	2.0	20.0
	Focallure	1		2.0	2.0	22.0
	Goban Cosmetics	1		2.0	2.0	24.0
	HALE.	1		2.0	2.0	26.0
	Implora	1		2.0	2.0	28.0

	Indoganic	1	2.0	2.0	30.0
	Innisfree	1	2.0	2.0	32.0
	Inul Beauty	1	2.0	2.0	34.0
	L'oreal	3	6.0	6.0	40.0
	Liquid	1	2.0	2.0	42.0
	LT Pro	1	2.0	2.0	44.0
	Luxcrime	2	4.0	4.0	48.0
	Mad for Makeup	1	2.0	2.0	50.0
	Madame Gie	3	6.0	6.0	56.0
	Makeover	2	4.0	4.0	60.0
	Maybelline	4	8.0	8.0	68.0
	Mineral Botanica	1	2.0	2.0	70.0
	Oriflame	1	2.0	2.0	72.0
	PIXY	1	2.0	2.0	74.0
	Purbasari	1	2.0	2.0	76.0
	Raiku	1	2.0	2.0	78.0
	Rollover Reaction	1	2.0	2.0	80.0
	Rose All day	1	2.0	2.0	82.0
	Runa Beauty	1	2.0	2.0	84.0
	Sensatia Botanica	1	2.0	2.0	86.0
	Tiff Body	1	2.0	2.0	88.0
	Tony Moly	1	2.0	2.0	90.0
	Wardah	4	8.0	8.0	98.0

	Y.O.U	1	2.0	2.0	100.0
	Total	50	100.0	100.0	

Type	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Crayon	1	2.0	2.0	2.0
	Liquid	36	72.0	72.0	74.0
	Solid	1	2.0	2.0	76.0
	Stick	12	24.0	24.0	100.0
	Total	50	100.0	100.0	





As the data shown above, the population's frequency is based on the 50 data list of the Lip product that has been collected. Based on the 50 Lip products that have been collected, there are 34 brands within the 50 Lip products and 4 types of Lip products type within the 50 Lip products and the 34 brands in the data that we collected. There are 1 of crayon type, 12 of stick type, 36 of liquid type and 1 of solid type.

Sample

Statistics				
	Lip_Product	Brand	Type	
N	Valid		35	35
	Missing		0	0

Lip_Product	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 in 1 color tint	1	2.9	2.9
	Beauty Lip & Cheeck Crayon	1	2.9	2.9
	Coconut lip sleeping	1	2.9	8.6

	balm					
	Creamytint	1	2.9		2.9	11.4
	Dear Darling Water gel tint	1	2.9		2.9	14.3
	delight tony tint	1	2.9		2.9	17.1
	Dew tinted 6hr lip moisturizer	1	2.9		2.9	20.0

	Exclusive Matte Lip Cream	1	2.9	2.9	22.9
	Extra lip tint	1	2.9	2.9	25.7
	Hydra Lip Cheek Tint	1	2.9	2.9	28.6
	Infalible Pro Matte Lip Liquid	1	2.9	2.9	31.4
	Intense Matte Lip Cream	1	2.9	2.9	34.3
	Juicy Lip Balm	1	2.9	2.9	37.1
	lip and cheek dual use liquid	1	2.9	2.9	40.0
	Lip Care	1	2.9	2.9	42.9
	Lip Color	1	2.9	2.9	45.7
	Lip Cream	1	2.9	2.9	48.6
	Lip Cream Series	1	2.9	2.9	51.4
	Longlasting Matte Lip Cream Metalic	1	2.9	2.9	54.3
	magnifique lip tint	1	2.9	2.9	57.1
	Matte Lip Liquid	1	2.9	2.9	60.0

	Melted Matte Lip	1	2.9	2.9	62.9
	Metallic Lip Cream	1	2.9	2.9	65.7
	NIVEA LIP BALM SOOTHE & PRTECT	1	2.9	2.9	68.6
	Organic lip balm	1	2.9	2.9	71.4
	Perfect Matte Lip Coat	1	2.9	2.9	74.3
	Powestay Transfer Proof Matte Lip Cream	1	2.9	2.9	77.1
	Sensational Liquid Matte	1	2.9	2.9	80.0

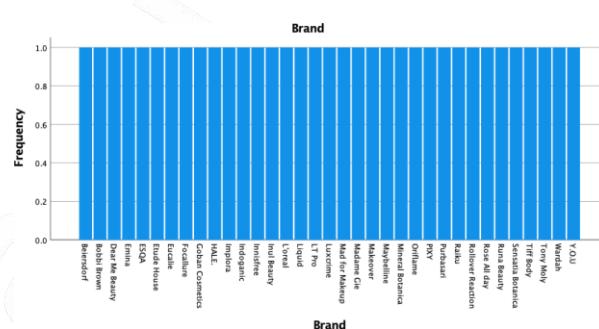
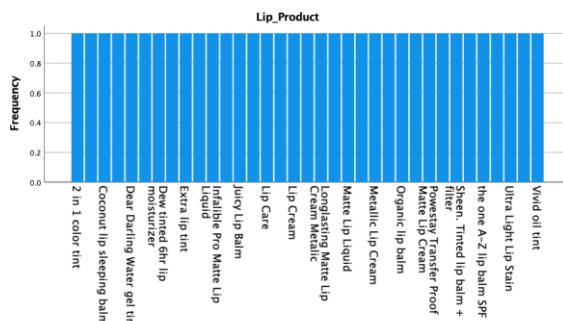
	Sheen. Tintedlip balm + UV filter	1	2.9	2.9	82.9
	SUEDED! Lip & Cheek Cream	1	2.9	2.9	85.7
	the one A-Z lip balm SPF 25	1	2.9	2.9	88.6
	The Simplicity Love You tint	1	2.9	2.9	91.4
	Ultra Light Lip Stain	1	2.9	2.9	94.3
	Urban Lip Cream Matte	1	2.9	2.9	97.1
	Vivid oil tint	1	2.9	2.9	100.0
	Total	35	100.0	100.0	

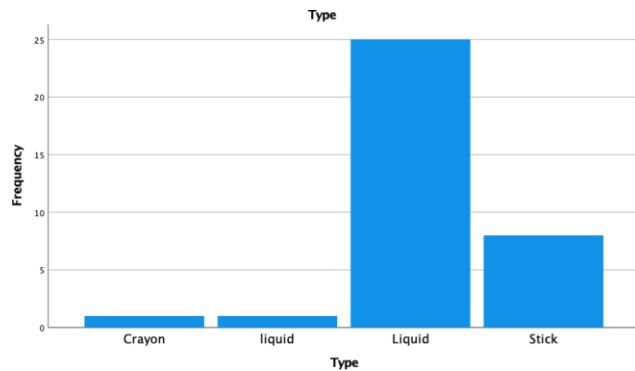
Brand	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Beiersdorf	1	2.9	2.9	2.9
	Bobbi Brown	1	2.9	2.9	5.7
	Dear Me	1	2.9	2.9	8.6

	Beauty					
	Emina	1	2.9		2.9	11.4
	ESQA	1	2.9		2.9	14.3
	Etude	1	2.9		2.9	17.1
	House					
	Eucalie	1	2.9		2.9	20.0
	Focallure	1	2.9		2.9	22.9
	Goban	1	2.9		2.9	25.7
	Cosmetics					
	HALE.	1	2.9		2.9	28.6
	Implora	1	2.9		2.9	31.4
	Indoganic	1	2.9		2.9	34.3
	Innisfree	1	2.9		2.9	37.1
	Inul	1	2.9		2.9	40.0
	Beauty					
	L'oreal	1	2.9		2.9	42.9
	Liquid	1	2.9		2.9	45.7
	LT Pro	1	2.9		2.9	48.6
	Luxcrime	1	2.9		2.9	51.4

	Mad for Makeup	1	2.9	2.9	54.3
	Madame Gie	1	2.9	2.9	57.1
	Makeover	1	2.9	2.9	60.0
	Maybelline	1	2.9	2.9	62.9
	Mineral Botanica	1	2.9	2.9	65.7
	Oriflame	1	2.9	2.9	68.6
	PIXY	1	2.9	2.9	71.4
	Purbasari	1	2.9	2.9	74.3
	Raiku	1	2.9	2.9	77.1
	Rollover Reaction	1	2.9	2.9	80.0
	Rose All day	1	2.9	2.9	82.9
	Runa Beauty	1	2.9	2.9	85.7
	Sensatia Botanica	1	2.9	2.9	88.6
	Tiff Body	1	2.9	2.9	91.4
	Tony Moly	1	2.9	2.9	94.3
	Wardah	1	2.9	2.9	97.1
	Y.O.U	1	2.9	2.9	100.0
	Total	35	100.0	100.0	

Type	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Crayon	1	2.9	2.9	2.9
	liquid	1	2.9	2.9	5.7
	Liquid	25	71.4	71.4	77.1
	Stick	8	22.9	22.9	100.0
	Total	35	100.0	100.0	





As the data shown above, the Sampling's frequency is based on the 35 data list of the Lip product that has been collected. Based on the 35 Lip products that have been collected, there are 35 brands within the 35 Lip products and 4 types of Lip products type within the 35 Lip products and the 35 brands in the data that we collected. There are 1 of crayon type, 8 of stick type and 26 of liquid type.

3.2 Quantitative data

Explain the data: mean, mode, median, variance, standard deviation, quartile 1 and 3, interquartile (population and sample)

Create bar chart and/or pie chart, histogram and boxplot (population and sample)

Population

Statistics		Shades	Price	
N	Valid		50	50
	Missing		0	0
Mean		8.38	88852.900	
Median		5.50	78500.000	
Mode		5	129000.0 ^a	
Std. Deviation		8.859	56095.5854	

n			
Variance	78.485	3146714696.010	
Minimum	1	23000.0	
Maximum	45	345000.0	
Percentile s	25	3.75	44750.000
	50	5.50	78500.000
	75	10.00	126000.000

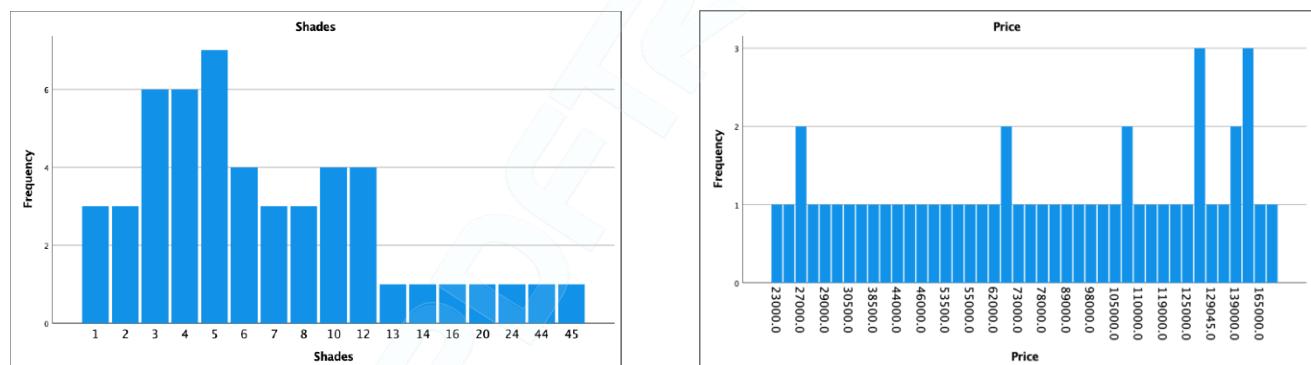
Shades	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	1	3	6.0	6.0	6.0
	2	3	6.0	6.0	12.0
	3	6	12.0	12.0	24.0
	4	6	12.0	12.0	36.0
	5	7	14.0	14.0	50.0
	6	4	8.0	8.0	58.0
	7	3	6.0	6.0	64.0
	8	3	6.0	6.0	70.0
	10	4	8.0	8.0	78.0
	12	4	8.0	8.0	86.0
	13	1	2.0	2.0	88.0
	14	1	2.0	2.0	90.0
	16	1	2.0	2.0	92.0
	20	1	2.0	2.0	94.0
	24	1	2.0	2.0	96.0
	44	1	2.0	2.0	98.0
	45	1	2.0	2.0	100.0
Total		50	100.0	100.0	

Price	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	23000.0	1	2.0	2.0	2.0
	24000.0	1	2.0	2.0	4.0
	27000.0	2	4.0	4.0	8.0
	28000.0	1	2.0	2.0	10.0
	29000.0	1	2.0	2.0	12.0
	30000.0	1	2.0	2.0	14.0

30500.0	1	2.0	2.0	16.0
35000.0	1	2.0	2.0	18.0
38500.0	1	2.0	2.0	20.0
43000.0	1	2.0	2.0	22.0
44000.0	1	2.0	2.0	24.0
45000.0	1	2.0	2.0	26.0
46000.0	1	2.0	2.0	28.0
51900.0	1	2.0	2.0	30.0
53500.0	1	2.0	2.0	32.0
53700.0	1	2.0	2.0	34.0
55000.0	1	2.0	2.0	36.0
60000.0	1	2.0	2.0	38.0
62000.0	1	2.0	2.0	40.0
69000.0	2	4.0	4.0	44.0
73000.0	1	2.0	2.0	46.0
75000.0	1	2.0	2.0	48.0
78000.0	1	2.0	2.0	50.0

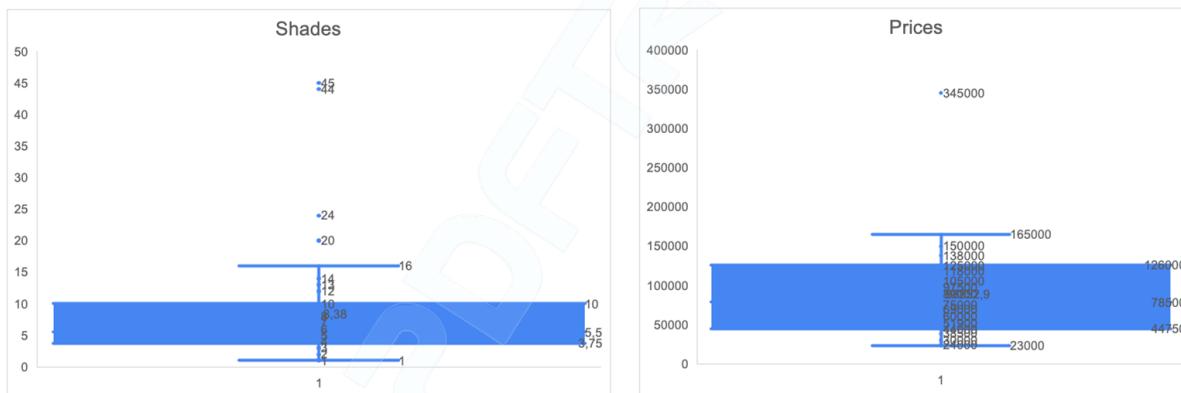
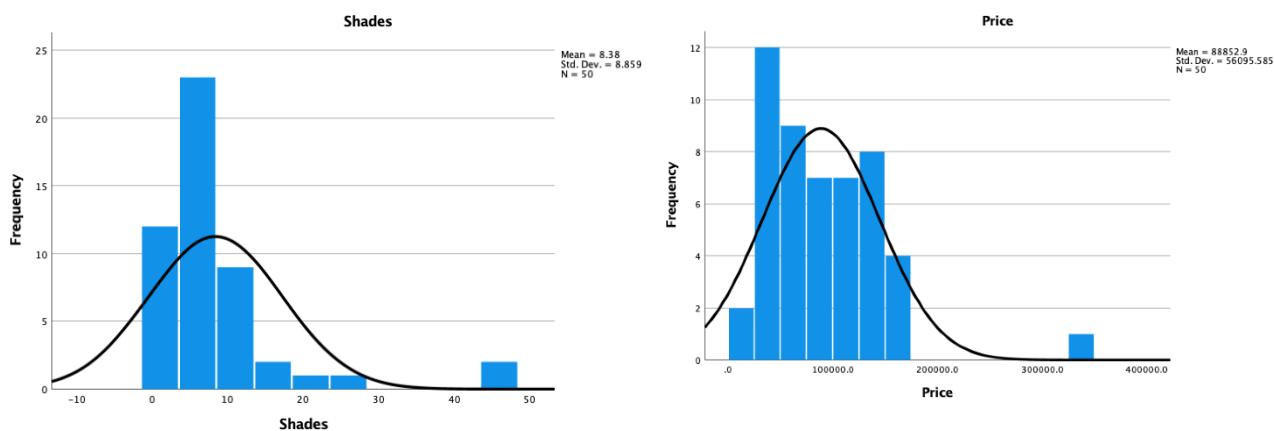
79000.0	1	2.0	2.0	52.0
89000.0	1	2.0	2.0	54.0
97500.0	1	2.0	2.0	56.0
98000.0	1	2.0	2.0	58.0
99000.0	1	2.0	2.0	60.0
105000.0	1	2.0	2.0	62.0
109000.0	2	4.0	4.0	66.0
110000.0	1	2.0	2.0	68.0
118000.0	1	2.0	2.0	70.0
119000.0	1	2.0	2.0	72.0
123000.0	1	2.0	2.0	74.0
125000.0	1	2.0	2.0	76.0
129000.0	3	6.0	6.0	82.0
129045.0	1	2.0	2.0	84.0
138000.0	1	2.0	2.0	86.0
139000.0	2	4.0	4.0	90.0
150000.0	3	6.0	6.0	96.0
165000.0	1	2.0	2.0	98.0
345000.0	1	2.0	2.0	100.0
Total	50	100.0	100.0	

Bar chart



As the data shown above, the population's frequency is based on the 50 data list of the Lip product that has been collected. Based on the 50 Lip products that have been collected, there are 17 shades within the 50 Lip products and 21 classes of Lip products prices within the 50 Lip products and the 17 shades class in the data that we collected. 3,4,5 shades of lip products dominate the chart by 6+ frequency. Furthermore, the price class of 125000 to 129045 and 139000 to 165000 has the highest frequency of lip products. However, there are 4 class prices that have more than 1 frequency of product in the price class of 27000, 62000-73000, 105000-110000, 139000 with the frequency of 2 products.

Histogram



We can observe from the boxplot above that some data are outside of most data collection or are not placed in the blue box. Which are 4 data: 20, 24, 44, 45 for the shades Boxplot and only 1 data of 345000 for the price Boxplot that are on the outside of the blue box.

Sample

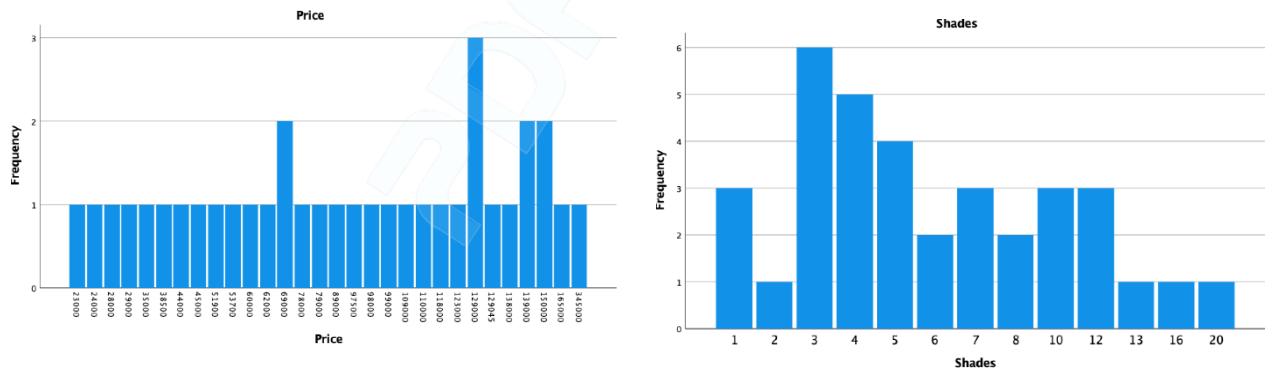
Statistics		Shades	Price	
			35	35
N	Valid		35	35
	Missing		0	0
Mean		6.49	96418.43	
Median		5.00	97500.00	
Mode		3	129000	
Std. Deviation		4.448	60455.731	
Variance		19.787	3654895415.840	
Minimum		1	23000	
Maximum		20	345000	
Percentiles	25		3.00	5190 0.00
	50		5.00	9750 0.00
	75		10.00	1290 00.00

Shades	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	1	3	8.6	8.6	8.6
	2	1	2.9	2.9	11.4
	3	6	17.1	17.1	28.6
	4	5	14.3	14.3	42.9
	5	4	11.4	11.4	54.3
	6	2	5.7	5.7	60.0
	7	3	8.6	8.6	68.6
	8	2	5.7	5.7	74.3
	10	3	8.6	8.6	82.9
	12	3	8.6	8.6	91.4
	13	1	2.9	2.9	94.3
	16	1	2.9	2.9	97.1
	20	1	2.9	2.9	100.0
Total		35	100.0	100.0	

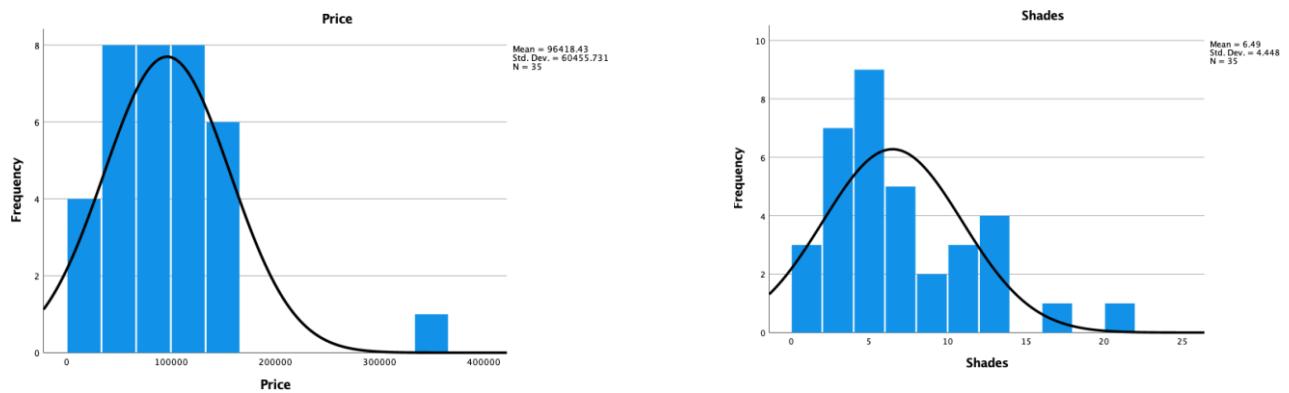
Price	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	23000	1	2.9	2.9	2.9
	24000	1	2.9	2.9	5.7
	28000	1	2.9	2.9	8.6
	29000	1	2.9	2.9	11.4
	35000	1	2.9	2.9	14.3
	38500	1	2.9	2.9	17.1

	44000	1	2.9	2.9	20.0
	45000	1	2.9	2.9	22.9
	51900	1	2.9	2.9	25.7
	53700	1	2.9	2.9	28.6
	60000	1	2.9	2.9	31.4
	62000	1	2.9	2.9	34.3
	69000	2	5.7	5.7	40.0
	78000	1	2.9	2.9	42.9
	79000	1	2.9	2.9	45.7
	89000	1	2.9	2.9	48.6
	97500	1	2.9	2.9	51.4
	98000	1	2.9	2.9	54.3
	99000	1	2.9	2.9	57.1
	109000	1	2.9	2.9	60.0
	110000	1	2.9	2.9	62.9
	118000	1	2.9	2.9	65.7
	123000	1	2.9	2.9	68.6
	129000	3	8.6	8.6	77.1
	129045	1	2.9	2.9	80.0
	138000	1	2.9	2.9	82.9
	139000	2	5.7	5.7	88.6
	150000	2	5.7	5.7	94.3
	165000	1	2.9	2.9	97.1
	345000	1	2.9	2.9	100.0
	Total	35	100.0	100.0	

Bar

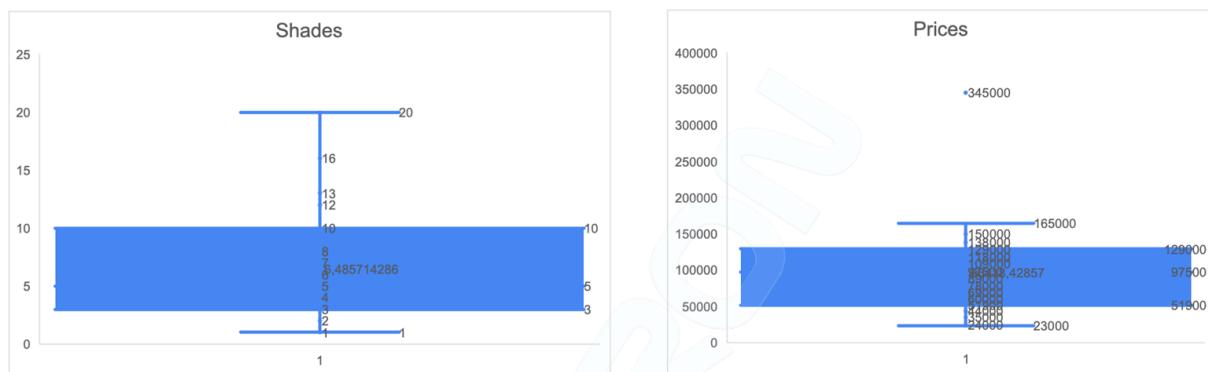


Histogram



As the data shown above, the Sampling's frequency is based on the 35 data list of the Lip product that has been collected. Based on the 35 Lip products that have been collected, there are 17 shades class within the 50 Lip products and 21 classes of Lip products prices within the 50 Lip products and the 17 shades class in the data that we collected. Class 3 shades of lip products dominate the chart with the highest frequency by 6+ frequency. Furthermore, the price class of 129000 has the highest frequency of lip products. However, there are 3 class prices that have more than 1 frequency of product in the price class of 69000, 139000, 150000 with the frequency of 2 products. Furthermore, from the bar above we can see that the mean of the lip products price is at 96418.43 and for the shades mean is at 6.49.

Boxplot



We can observe from the boxplot above that some data are outside of most data collection or are not placed in the blue box. Which are 3 data: 16, 13, 12 for the shades of Boxplot. However for the price's Boxplot it's only one data which are 345000 that are outside the blue box.

4. Messages

Summarize the result

In conclusion, based on this statistical research Liquid type Lip Products are the most popular types of lip products available in indonesia. Moreover, there are plenty of shades per product available on the market that vary from 1 to 45. Furthermore, EMINA, MAYBELLINE, WARDAH are the most popular brands in indonesia. Lastly, the average price of Lip products that are available in Indonesia is Rp. 90,074.00. Therefore, we can conclude that our group has successfully completed our objectives of determining several indicators of lip products in Indonesia based on population and sample gathered from secondary data

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CASE STUDY 8.

DATA ANALYSIS OF AUTOMOTIVE SALES FROM 2011-2017 IN INDONESIA

1. Motivation

1.1 Background

In this era of Big Data, statistics play a significant role in helping to make people's daily lives easier. For example, the role of statistics can be seen in scientific activities, teaching and learning process activities, and in scientific activities. Not only that, research and statistics are two things that cannot be separated. Statistics have direct links and benefits with many things in human life. The benefits or usefulness of statistics, of course, are not limited to scientific activities such as research. Statistics are also widely used, both in the natural sciences and in business, industry, and economics.

In recent years, the Indonesian automotive industry has shown significant developments. This is part of the positive impact of the growth in the number of Indonesia's middle class over the past decade.

According to the World Bank, the middle class in 2002 only reached seven percent of Indonesia's total population. That number jumped significantly in 2017 to 22 percent.

Meanwhile, there are another 120 million people classified as aspiring middle class or middle-class hope. They are a group that is no longer poor and is moving towards a more established economic condition. The World Bank predicts that Indonesia's middle class in 2050 will reach 143 million people or more than 50 percent of the total population.

Referring to the World Bank's criteria, the middle class is a group of people with a daily expenditure of between 2 and 20 United States (US) dollars. The existence of the middle class

is considered important in economic growth because it is the main element driving the wheels of production and consumption.

According to the Central Statistics Agency (BPS), the middle-class accounts for at least 45 percent of total domestic consumption. In addition to a relatively high income, the middle class is also characterized by its consumption behaviour which tends to be oriented towards fulfilling secondary, even tertiary needs.

Not only actors, the role of the government is also needed to face the challenges of the national automotive industry in the global arena. In this context, the government is obliged to ensure a conducive manufacturing business climate and environment.

On the regulatory side, the government must ensure that existing regulations are able to provide an umbrella for the automotive industry from upstream to downstream. In addition to regulations that are adaptive to the interests of automotive industry players, the government is also obliged to develop infrastructure that supports smooth logistics mobility as well as the export-import process of goods. This active collaboration between industry players and the government is expected to make the national automotive industry victorious in local, regional and global markets.

So, how does automotive industry in Indonesia?

1.2 Objective

1. To identify the automotive sales in Indonesia based on the data from 2011 to 2017
2. To analyse data using bar chart, pie chart, histogram and box plot
3. To describe the data of automotive sales in Indonesia from 2011 until 2017

1.3 Question

1. How does automotive industry in Indonesia?
2. What is the qualitative data for automotive sales in Indonesia from 2011 until 2017?
3. What is the quantitative data for automotive sales in Indonesia from 2011 until 2017?

4. How to define the data using bar chart, pie chart, histogram, and box plot?

2. Method

2.1 Data

All the data we will include in this report is the secondary data. We found the data from a few websites in the internet. We only put the data for certain year which is from 2011 to 2017. In this data, we will analyse the sales of automotive from brand new only in Indonesia.

2.2 Sampling

The data below of automotive sales in Indonesia from 2011 until 2017:

THE DATA OF AUTOMOTIVE SALES IN INDONESIA				
Category	Brand	Year	Indicator	Total Sales
Car	Toyota	2011	4	311.136
Car	Daihatsu		3	139.544
Car	Honda C		1	45.416
Car	Mitsubishi		3	134.416
Car	Suzuki C		2	94.569
Bike	Honda B		5	4.275.212
Bike	Yamaha		5	3.146.055
Bike	Suzuki B		4	494.427
Bike	Kawasaki		2	96.058
Bike	TVS	2012		
Car	Toyota		4	406.026

Car	Daihatsu		3	162.742
Car	Honda C		2	69.320
Car	Mitsubishi		3	148.918
Car	Suzuki C		3	126.577
Bike	Honda B		5	4.092.693
Bike	Yamaha		5	2.433.924
Bike	Suzuki B		4	461.137
Bike	Kawasaki		3	131.657
Bike	TVS			
Car	Toyota		4	434.854
Car	Daihatsu		3	185.942
Car	Honda C		2	91.493
Car	Mitsubishi		3	157.353
Car	Suzuki C		3	164.006
Bike	Honda B		5	4.696.999
Bike	Yamaha		5	2.492.596
Bike	Suzuki B		4	393.803
Bike	Kawasaki		3	151.703
Bike	TVS		1	8.778
Car	Toyota	2014	4	399.746

Car	Daihatsu		3	185.226
Car	Honda C		3	159.147
Car	Mitsubishi		3	141.962
Car	Suzuki C		3	154.923
Bike	Honda B		5	5.051.100
Bike	Yamaha		5	2.371.082
Bike	Suzuki B		4	275.067
Bike	Kawasaki		3	165.371
Bike	TVS		1	9.575
Car	Toyota		4	322.466
Car	Daihatsu		3	167.808
Car	Honda C		3	159.253
Car	Mitsubishi		3	112.527
Car	Suzuki C		3	121.805
Bike	Honda B		5	4.453.888
Bike	Yamaha		5	1.798.630
Bike	Suzuki B		3	109.882
Bike	Kawasaki		3	115.008
Bike	TVS		1	2.747
Car	Toyota	2016	4	382.610

Car	Daihatsu		3	189.683
Car	Honda C		3	199.364
Car	Mitsubishi		2	97.761
Car	Suzuki C		2	92.950
Bike	Honda B		5	4.380.888
Bike	Yamaha		5	1.394.078
Bike	Suzuki B		3	56.824
Bike	Kawasaki		3	97.622
Bike	TVS		1	1.873
Car	Toyota		4	372.614
Car	Daihatsu		3	186.381
Car	Honda C		3	186.859
Car	Mitsubishi		3	121.395
Car	Suzuki C		3	111.660
Bike	Honda B		5	4.385.888
Bike	Yamaha		5	1.348.211
Bike	Suzuki B		2	72.191
Bike	Kawasaki		2	78.637
Bike	TVS		1	1.176

Based on the data above, there is some question.

1. **What is the population?** The population is the entire automotive sales in Indonesia whole time
2. **What is the sampling frame?** The sampling frame is the entire automotive's brand sales in Indonesia whole time
3. **What is the sampling technique?** The sampling technique is cluster sampling
4. **How many the sample size?** The sample size is 68 sample
5. **How much is the confidence interval?** 95%

3. Mechanic

3.1 Qualitative Data

Our data consist of qualitative and quantitative data. For the qualitative data, there is 2 sample, category and brand. We use scale to classify the data to make it easier to understand. The scale consists of:

1. Very low : <50.000
2. Low : 50.001 – 100.000
3. Normal : 100.001 – 250.000
4. High : 250.001 – 1.000.000
5. Very high : >1.000.000

Category
Car
Bike
Brand
Toyota
Daihatsu
Honda C

Mitsubishi
Suzuki C
Yamaha
Kawasaki
TVS

	Frequency
Category	2
Brand	8

3.2 Quantitative Data

Quantitative data of the sample is the total sales. We divide the number for the scale of 1 to 5 as we mention before.

3.2.1 Population

Case Processing Summary

Cases	Case Processing Summary					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sales Indicator	68	100.0%	0	0.0%	68	100.0%

Sales Indicator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	6	8.8	8.8	8.8
	Low	8	11.8	11.8	20.6
	Normal	29	42.6	42.6	63.2
	High	11	16.2	16.2	79.4
	Very High	14	20.6	20.6	100.0
	Total	68	100.0	100.0	

Descriptives

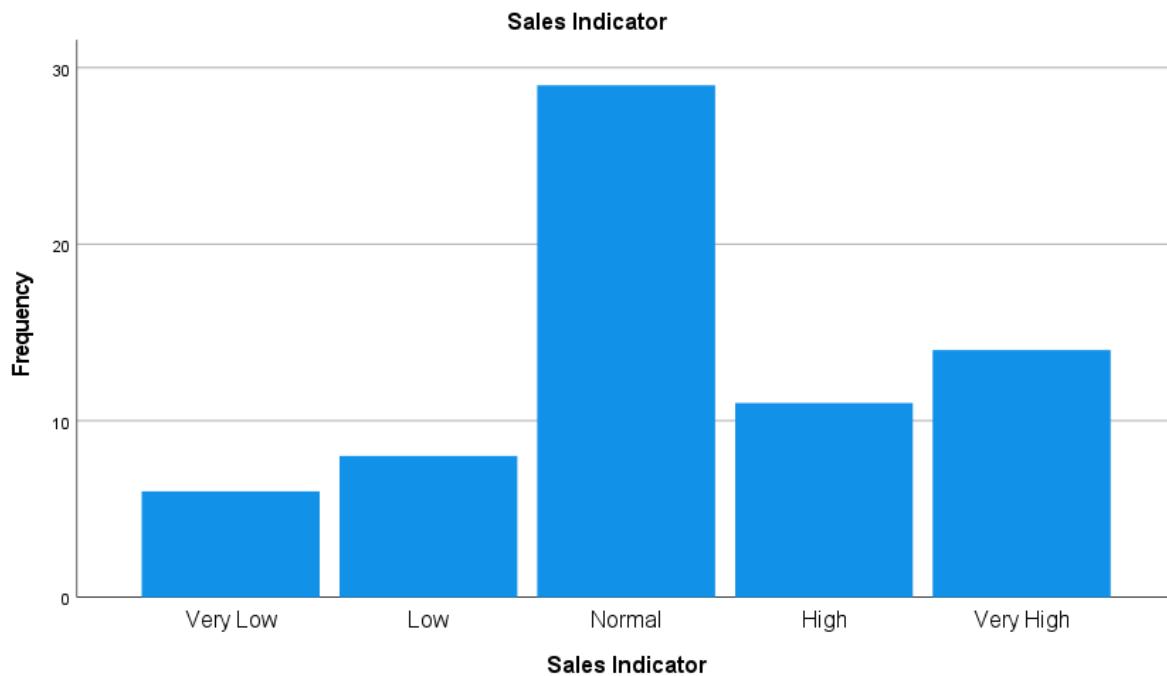
Sales Indicator	Statistic	Std. Error
Mean	3.28	.143
95% Confidence Interval for Mean	2.99	
Lower Bound		
Upper Bound	3.57	
5% Trimmed Mean	3.31	
Median	3.00	
Variance	1.398	
Std. Deviation	1.183	
Minimum	1	
Maximum	5	
Range	4	
Interquartile Range	1	
Skewness	-.121	.291
Kurtosis	-.558	.574

Statistics

Sales Indicator

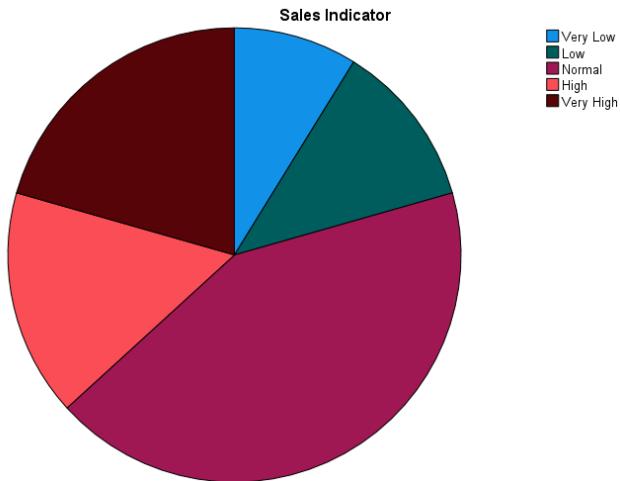
N	Valid	68
	Missing	0
Mean		3.28
Median		3.00
Mode		3
Std. Deviation		1.183
Variance		1.398
Sum		223
Percentiles	25	3.00
	50	3.00
	75	4.00

a. Bar Chart

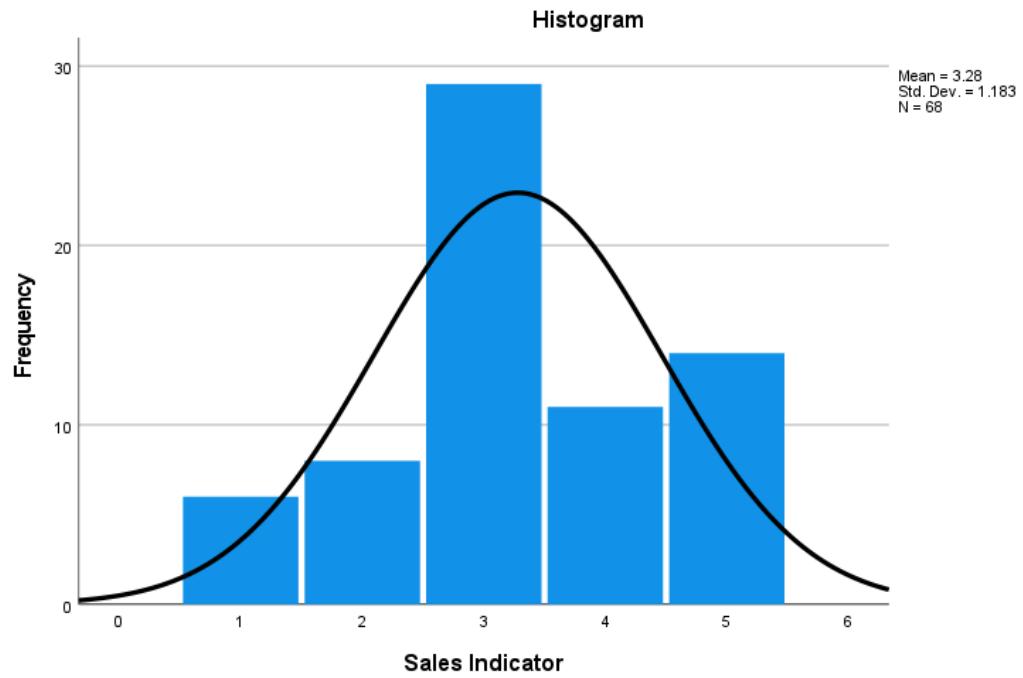


The chart shows that the total sales of automotive sales in Indonesia in 2011 until 2017 is mostly normal, followed by very high, then high and low, and less than very low.

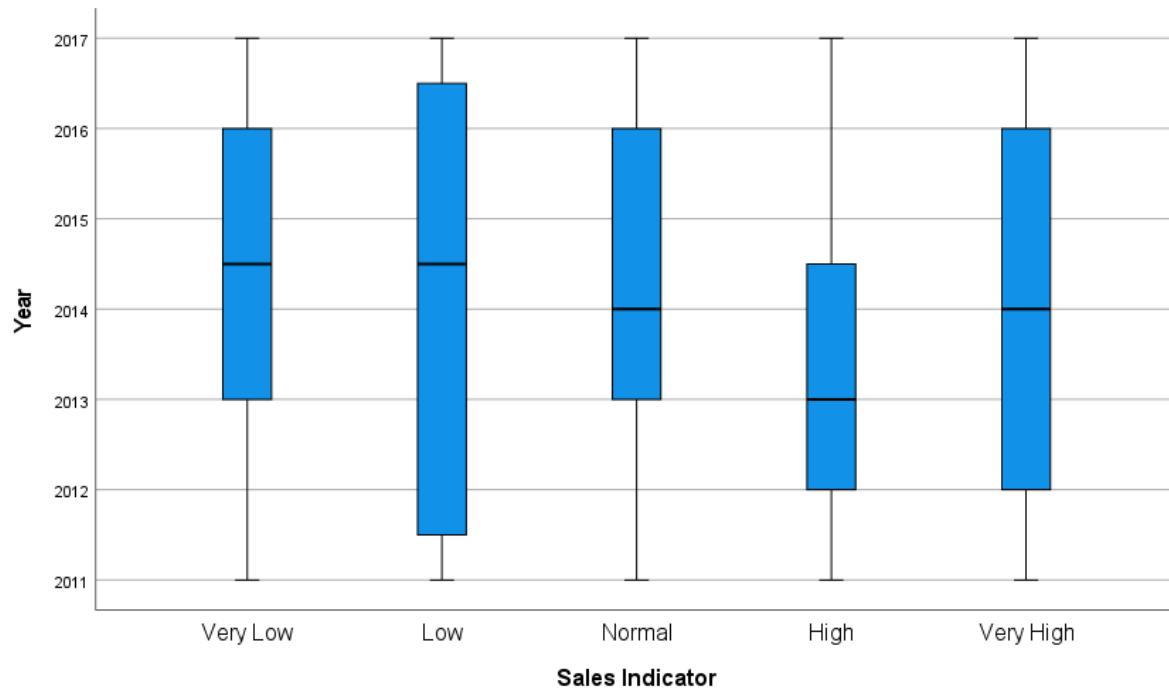
b. Pie Chart



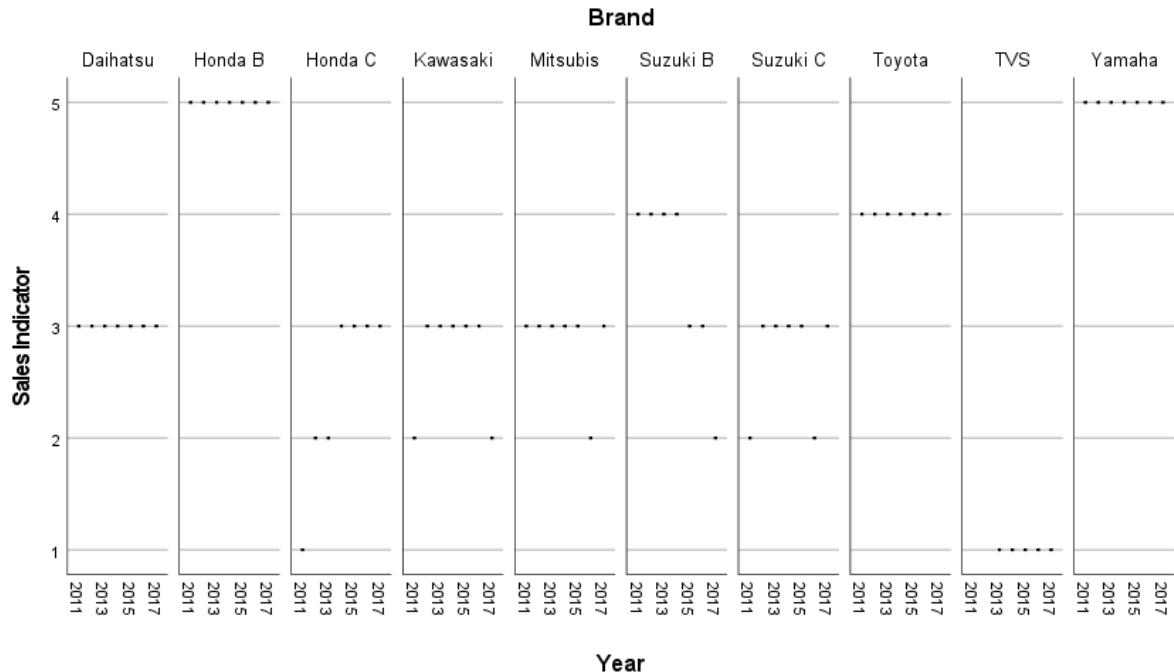
c. Histogram



d. Box Plot



Boxplot based on the Brand



Based on the box plot that we divide in to each brand, some brands are very consistent in making very high sales like Yamaha and Honda Bike.

3.2.2 Sample (Brand Suzuki)

Case Processing Summary

Sales Indicator	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sales Indicator	14	100.0%	0	0.0%	14	100.0%

Sales Indicator

Valid	Low	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low	3	21.4	21.4	21.4

Normal	7	50.0	50.0	71.4
High	4	28.6	28.6	100.0
Total	14	100.0	100.0	

Descriptives

Sales Indicator	Statistic	Std. Error
Mean	3.07	.195
95% Confidence Interval for Mean	Lower Bound	2.65
	Upper Bound	3.49
5% Trimmed Mean	3.08	
Median	3.00	
Variance	.533	
Std. Deviation	.730	
Minimum	2	
Maximum	4	
Range	2	
Interquartile Range	1	
Skewness	-.113	.597
Kurtosis	-.856	1.154

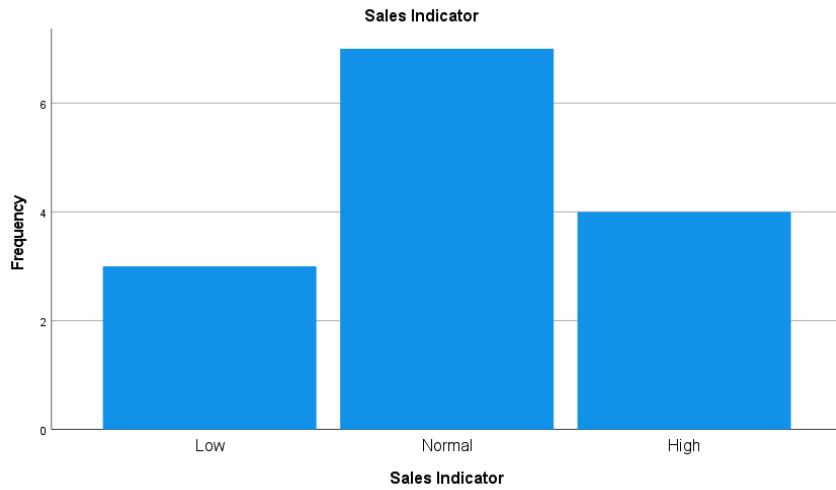
Statistics

Sales Indicator

N	Valid	14
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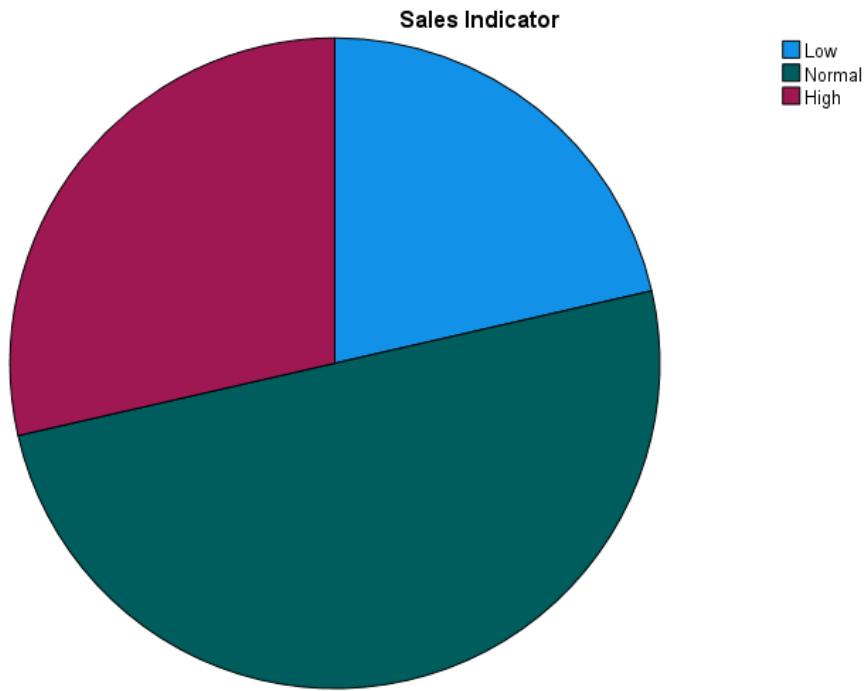
	Missing	0
Mean		3.07
Median		3.00
Mode		3
Std. Deviation		.730
Variance		.533
Percentiles	25	2.75
	50	3.00
	75	4.00

a. Bar Chart

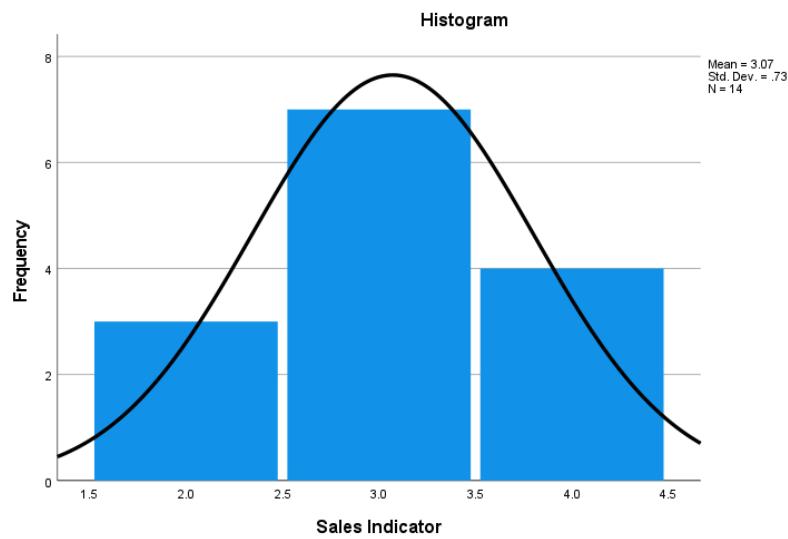


The chart shows that the total sales of Suzuki for bike and car sales in Indonesia in 2011 until 2017 is mostly normal too as like the most brand, but this brand is never had touch very high sales or very low sales.

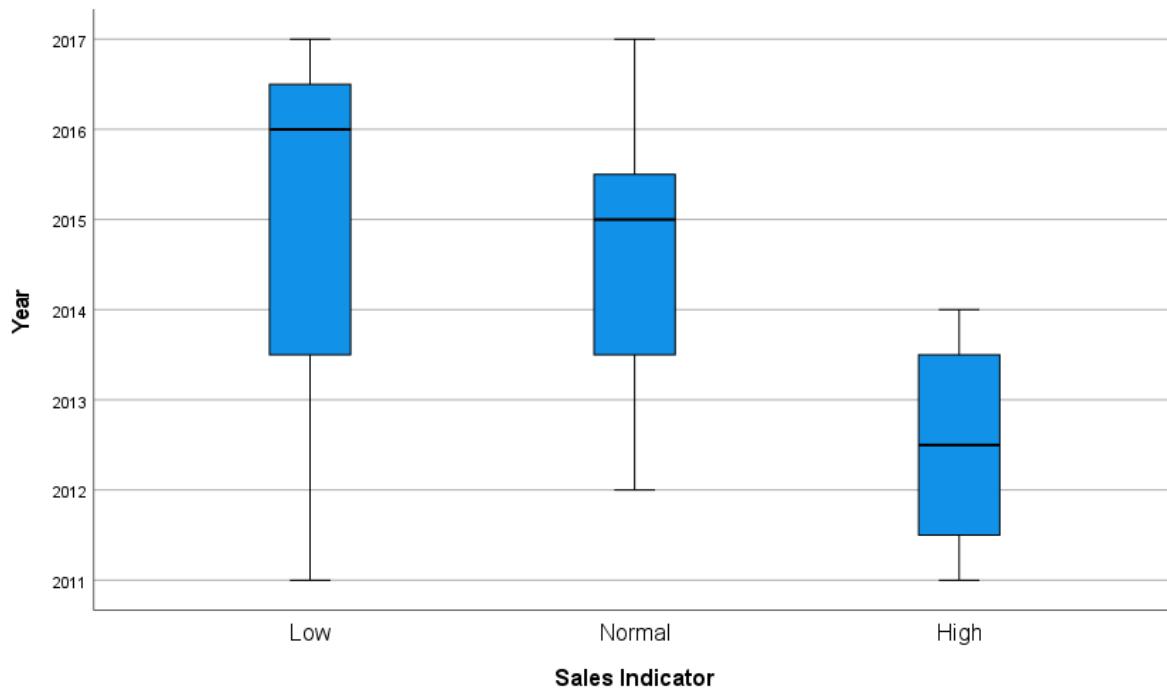
b. Pie Chart



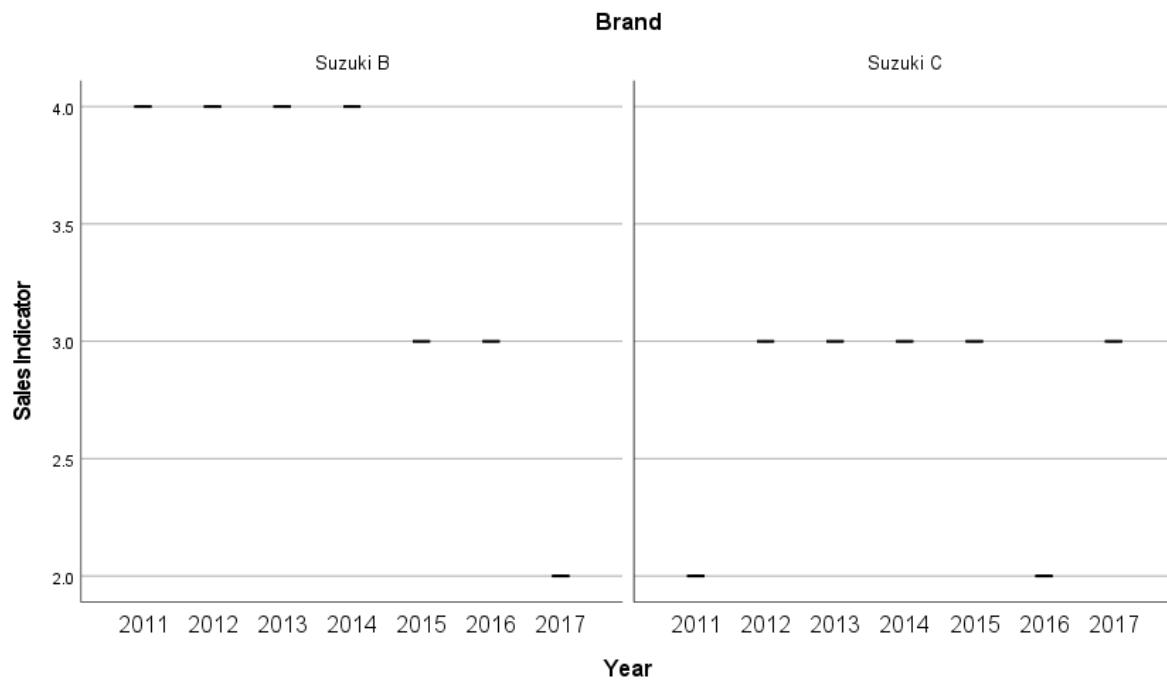
c. Histogram



d. Boxplot



Boxplot based on brand



Based on the box plot that we divide in to each category, shown that bike sales are more high comparing to the car. It's very reasonable that the price of bike is much cheaper than car.

4. Message

In conclusion, based on the analysis that we conduct using SPSS, most of the sales are normal. Some company shown a stagnant sale over year, and some of the others are fluctuate. Honda bike and Yamaha consistent on very high sales from 2011 to 2017, the opposite with TVS that on very low sales comparing to the other brand. Besides that, we also show a few charts to make it easier to understand the data result.

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CASE STUDY 9.

PUBLIC PROPERTY & REAL ESTATE COMPANIES STOCK PRICE IN TIMES OF THE COVID-19 PANDEMIC IN INDONESIA (2020- 2021)

1. Motivation

1.1 Background

Currently, the Covid-19 pandemic has spread throughout the world. Initially, this did not affect the stock market, but as more victims were confirmed, the stock market reacted negatively. This also causes prices on the stock market to decline, especially after the WHO stated that Covid-19 was a pandemic and caused a negative abnormal return. The Covid-19 pandemic in Indonesia affected the capital market and caused a change in trading time on the Indonesia Stock Exchange and this was a negative signal that caused investors to be more interested in selling their shareholdings. The conditions of the Covid-19 pandemic have also affected stock market dynamics, causing stock exchanges around the world to experience a decline and increasing inefficiencies in the stock market. In Indonesia, this also has a negative impact on the capital market and influences investors in making investment decisions.

Indonesia's economic growth before Covid-19 in 2014-2019 tended to be stable at 4.97% - 5.20%. Then in the first quarter of 2020, there was a significant decline in economic growth to 2.97%. This decline can be caused by many factors, one of which is due to the Covid-19 pandemic which has greatly affected national economic activity. Of course, the decline in economic growth has also had an impact on the development of the stock market in Indonesia. In the end, the decline in the stock market will also have a negative effect on economic growth. This can provide a quite large domino effect as previously discussed that the stock market contributes to the economic growth of a country.

Therefore, we have the intention to determine the condition of Indonesia's Property & Real Estate sector by studying the stock performances of related companies. We will analyze 50 samples of public property & real estate companies listed on the Indonesia Stock Exchange (IDX) in 2020 and 2021.

1.2 Objective

1. Identify the type of data provided.
2. Define the quantitative and qualitative data.
3. Analyze the stock performances of public Property & Real Estate companies during The Covid-19 pandemic in Indonesia using the bar chart and/or pie chart, histogram, and boxplot.

1.3 Questions

1. What is the type of data provided?
2. What are the quantitative and qualitative data?
3. How are the stock performances of public Property & Real Estate companies during The Covid-19 pandemic in Indonesia?

2. Method

2.1 Data

In this study, both primary and secondary data were used. Secondary data is the historical data of stock prices of the companies that were taken from the IDX database, while the primary data is the state of the companies' performance which we concluded from the secondary as an additional variable, "Performance".

2.2 Sampling

The raw data and population in this study are of 50 public Property & Real Estate companies

from the IDX from 2020 and 2021. The sampling frame of this study is as follows:

Company	2020	2021	Difference	Performance
Makmur Berkah Amanda Tbk.	312	525	0.68	Striving
Agung Podomoro Land Tbk.	188	122	-0.35	Not doing well
Armidian Karyatama Tbk.	50	50	0.00	Doing well
Andalan Sakti Primaindo Tbk.	100	74	-0.26	Not doing well
Alam Sutera Realty Tbk.	242	162	-0.33	Not doing well
Trimitra Prawara Goldland Tbk.	152	181	0.19	Doing well
Bekasi Asri Pemula Tbk.	50	68	0.36	Doing well
Bhakti Agung Propertindo Tbk.	50	50	0.00	Doing well
Bumi Benowo Sukses Sejahtera Tbk.	102	50	-0.51	Struggling
Bumi Citra Permai Tbk.	75	92	0.23	Doing well
Bekasi Fajar Industrial Estate Tbk.	180	112	-0.38	Not doing well
Binakarya Jaya Abadi Tbk.	186	250	0.34	Doing well
Bhuwanatala Indah Permai Tbk.	50	55	0.10	Doing well
Bukti Darmo Properti Tbk.	51	88	0.73	Striving
Sentul City Tbk.	50	59	0.18	Doing well
Bumi Serpong Damai Tbk.	1225	1010	-0.18	Not doing well
Natura City Developments Tbk.	87	175	1.01	Striving
Cowell Development Tbk	50	50	0.00	Doing well
Capri Nusa Satu Properti Tbk.	50	50	0.00	Doing well
Maha Properti Indonesia Tbk.	1740	850	-0.51	Struggling
Ciputra Development Tbk.	985	970	-0.02	Not doing well
Diamond Citra Propertindo Tbk.	52	50	-0.04	Not doing well
Duta Anggada Realty Tbk.	224	312	0.39	Doing well

Table 1. List of the sampling frame 3

Bumi Serpong Damai Tbk.	1225	1010	-0.18	Not doing well
Natura City Developments Tbk.	87	175	1.01	Striving
Cowell Development Tbk	50	50	0.00	Doing well
Capri Nusa Satu Properti Tbk.	50	50	0.00	Doing well
Maha Properti Indonesia Tbk.	1740	850	-0.51	Struggling
Ciputra Development Tbk.	985	970	-0.02	Not doing well
Diamond Citra Propertindo Tbk.	52	50	-0.04	Not doing well
Duta Anggada Realty Tbk.	224	312	0.39	Doing well
Intiland Development Tbk.	220	156	-0.29	Not doing well
Puradelta Lestari Tbk.	246	191	-0.22	Not doing well
Duta Pertiwi Tbk.	3800	3390	-0.11	Not doing well
Bakrieland Development Tbk.	50	50	0.00	Doing well
Megapolitan Developments Tbk	192	166	-0.14	Not doing well
Fortune Mate Indonesia Tbk.	670	380	-0.43	Not doing well
Forza Land Indonesia Tbk.	50	50	0.00	Doing well
Aksara Global Development Tbk.	50	50	0.00	Doing well
Gowa Makassar Tourism Development Tbk.	17950	16725	-0.07	Not doing well
Perdana Gapuraprime Tbk.	75	87	0.16	Doing well
Greenwood Sejahtera Tbk.	135	183	0.36	Doing well
Grand House Mulia Tbk.	1320	1625	0.23	Doing well
Royalindo Investa Wijaya Tbk.	126	102	-0.19	Not doing well
Indonesian Paradise Property Tbk.	730	650	-0.11	Not doing well
Metropolitan Land Tbk.	430	460	0.07	Doing well
Jaya Real Property Tbk	600	520	-0.13	Not doing well
Karya Bersama Anugerah Tbk.	50	62	0.24	Doing well
Kawasan Industri Jababeka Tbk.	214	166	-0.22	Not doing well
DMS Propertindo Tbk.	338	79	-0.77	Struggling
Trimitra Propertindo Tbk.	176	88	-0.50	Not doing well
Eureka Prima Jakarta Tbk.	114	114	0.00	Doing well
Lippo Cikarang Tbk.	1420	1205	-0.15	Not doing well
Lippo Karawaci Tbk.	214	141	-0.34	Not doing well
Metro Realty Tbk.	218	310	0.42	Doing well
Modernland Realty Tbk.	51	74	0.45	Doing well
Metropolitan Kentjana Tbk	28000	24925	-0.11	Not doing well
Mega Manunggal Property Tbk.	298	565	0.90	Striving

For this study, we divided the data between *Company*, 2020 (the stock price in the year 2020), 2021 (the stock price in the year 2021), *Difference* (the change in stock price from 2020 to 2021), and *Performance*. *Performance** consists of terms that will help determine the frequencies of the data.

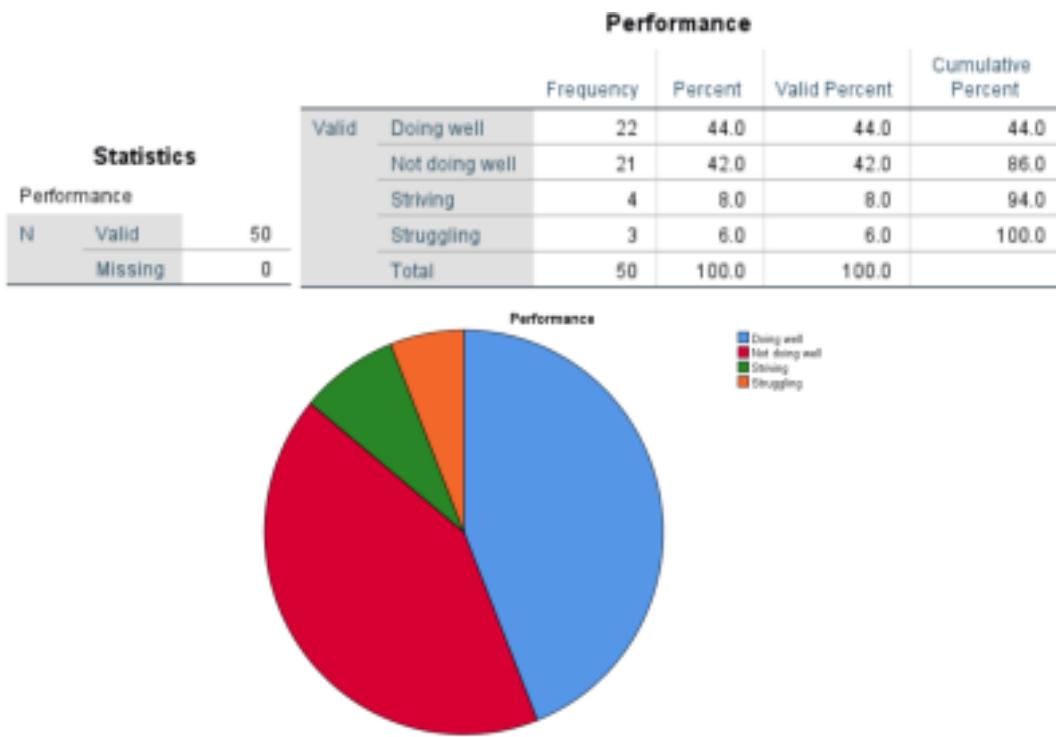
- [>.50] difference, indicates company striving
- [0 to .50] difference, indicates company doing well
- [0 to -.50] difference, indicates company not doing well
- [< -.50] difference, indicates company struggling

*Terms of *Performance*

3. Mechanics

3.1 Qualitative Data

The qualitative data is represented by *Performance*, being that it is the state of the companies' stock performance during the period of study.



As is shown by the various analysis conclusion graphs, most of the companies had done

relatively well at the end of 2021. Only a mere 6% of the sample companies, their stock prices plummeted during the pandemic. While the majority, about 86% of the sample, either was able to maintain their stock price or adapted enough so the business could continue with limited unnecessary issues. Then the rest of 8% even seem to manage to strive during this period of time.

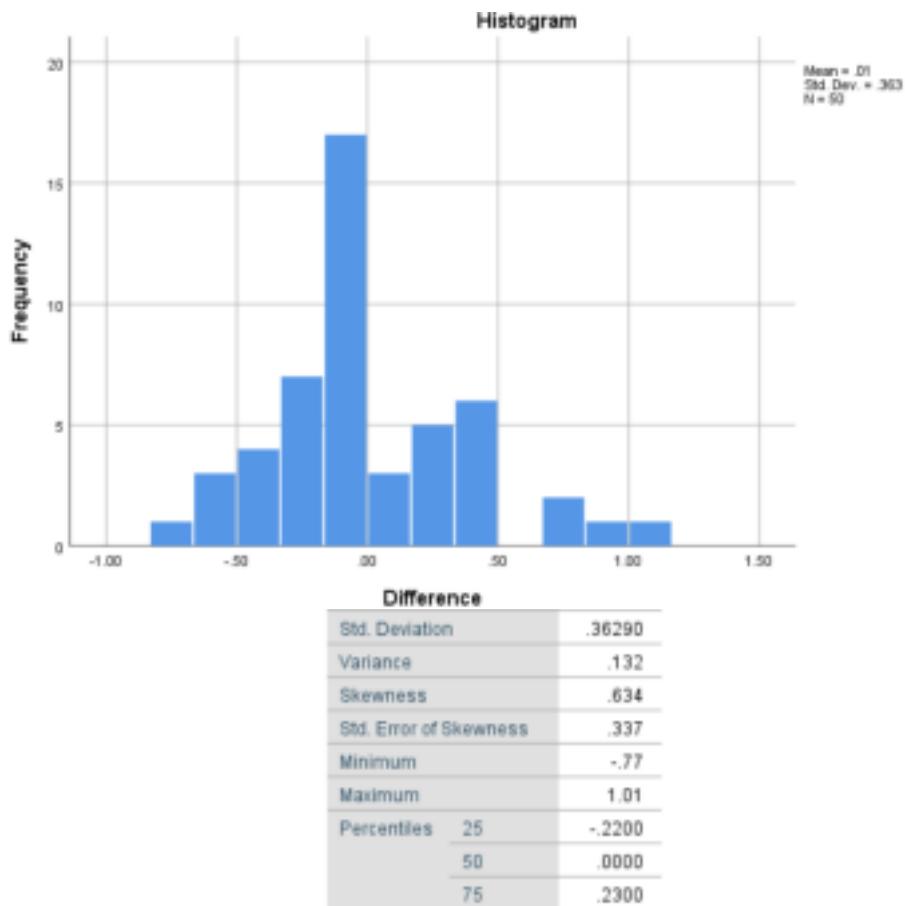
3.2 Quantitative Data

The quantitative data is represented by *Difference*, it is the change in stock price for 2020 to 2021 of the 50 sampled companies that are studied and analyzed. This data is deemed as the only numerical data used in the study. Values that portray how the companies fared during the early adapting times to the pandemic.

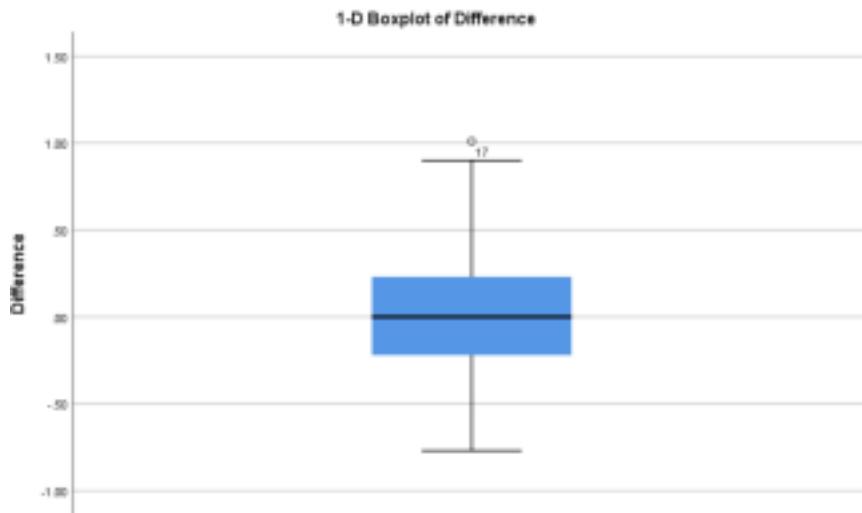
Before anything else, we will cover the baser statistics analysis of the companies' *Difference*. We were able to calculate the mean which is 0.136, the median and mode being zero, the standard deviation is 0.362, the variance is 0.132, and then the minimum and maximum being -0.77 and 1.01 respectively.

A histogram was also made to assist in the visual of the data compiled and observed in this study. From this, we are able to see that most of the sample companies have performance values around the median, which is zero. This means that most of those companies would fall into the category of companies that are either "doing well" or "not doing well". Those two categories aren't necessarily bad considering they mean that the companies are at worst able

to maintain their current state of business just as before the pandemic happened.



Boxplot



From the boxplot, it is even more visible that the skewness of our data is not too spread out

and more centered around the median.

4. Conclusion

From our analysis of the previously shown sample data, we can conclude that the public property and real estate companies have adapted relatively quite well in the face of the pandemic. Yes, there are some companies in our sample that have been not doing well or even struggling, but considering the initial hypothesis of the stock market being hit badly by the pandemic, the public property, and real estate industry have not been hit relatively that hard, or rather adapted well. This is represented quite well by the fact that only 6% of our data is in the struggling performance category, and the comparison of the companies that are doing well or even better and the companies that are not doing well or worse is 52:48 with the majority of the companies being better than -.25 stock prices difference.

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CASE STUDY 10.

THE GLOBAL PURCHASE OF PLAYSTATION 5

1. Motivation

1.1 Background

As technology and entertainment evolves, so does the market for it and how the market accepts the evolution of technology and entertainment. As part of this evolution, the next generation consoles were released back in Q4 of 2020. There are different next generation consoles made by different companies, but the one company that excels at engaging the market with its console innovations is Sony with their next generation console, the Playstation 5.

Considering that Covid-19 pandemic was peaking and still a big problem, it affects the sales as well as the supply of Playstation 5, productions cannot be pushed to its full potential, and sales are a bit halting due to the market's reduced buying power due to the many layoffs caused by Covid-19. The overall decrease of economy affects this sale, but Sony is still quite optimistic about pushing the PS5 to the market during that time period. It was the peak time for next gen consoles and it would still follow Sony's plan to release PS5 on November 12th 2020, whether there is a pandemic or not.

Knowing this condition, it creates many questions from sales, supplies, and customers' accessibility of attaining PS5 in the global market.

1.2 Objective

The objective of this report is to find out the following from the period of 2020-2022:

- Supply of PS5
- Global sales of PS5
- Retail purchases
- Official store purchases

- PS5 resellers/scalpers
- Price of PS5 in different regions

1.3 Question

The objectives above are meant to support the answer of the following questions:

- How does the Covid-19 pandemic affect PS5 supply?
- Can the PS5 sales be considered as a success for Sony?
- What is the gap of PS5 sales between retail, official store and resale purchases?
- What is the average price of PS5 so that customers can consider purchasing the product?
- Is it a good time for customers to buy PS5 in 2023?

2. Method

2.1 Data

We use secondary data to support research on Sony's sales of the Playstation 5. In order to see and observe about Sony's success with this newest Playstation product, even though the time of its release is in the midst of a pandemic where the world economy is. Early estimates predicted that, should the virus become a global pandemic, most major economies will lose at least 2.9 percent of their gross domestic product (GDP) over 2020. This forecast was already restated to a GDP loss of 3.4 percent. To put this number in perspective, global GDP was estimated at around 84.54 trillion U.S. dollars in 2020 meaning that a 4.5 percent drop in economic growth results in almost 2.96 trillion U.S. dollars of lost economic output.

From this data, it will be known whether Sony is able to penetrate the market with reduced purchasing power in this pandemic era with its confidence in market fanaticism for game console products that have existed since December 1994.

We will examine the validity of this data again by presenting 2 research statistical data, as a comparison, and finding the midpoint of the truth of the data.

2.2 Sampling

Population:

The population of this data is SONY's overall sales of its new product, the Playstation 5. This sale is the object of the entire group that we want to draw conclusions about before we enter into the sample taken specifically, pursuing from the entire data. On top of that, as a form of comparison, we also do a quick analysis of the Playstation 4's global sales in the first 3 years as a benchmark and comparison point towards the Playstation 5.

Sampling frame:

To put emphasis on our population, sampling frame is needed to understand the data even deeper, thus we categorize the price, store purchases, resale purchases, production, and resale price as our sampling frame to further establish the situation that Playstation 5 is in.

Sampling technique:

To get a clearer idea of this data, we decided to utilize the sampling technique of systematic. Since the data that we collected and we aim to analyze are interlinked with each other, it is ideal for us to think of this data systematically. All the elements of our data will contribute to the overall analysis of Playstation 5's global sales, this technique can also assist us in analyzing the many categories of this data into one cohesive analysis that can tackle a wide array of questions.

Sample size:

Since this data will focus on the global sales, our sample size will range based on the units of Playstation 5, which ranges from 4 - 67,3 Million units.

Confidence level interval:

The confidence level of 95% will prove that the data we compiled and analyzed will answer our questions of whether PS5 sales is considered to be successful and in the perspective of customers, is it the ideal time to purchase PS5 in 2023.

3. Mechanics

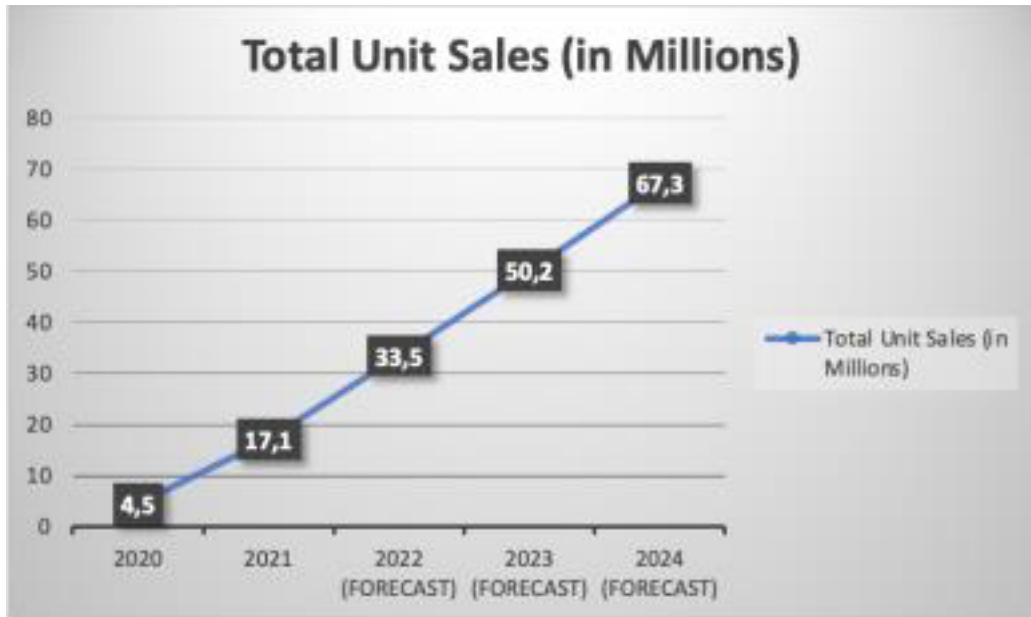
3.1 Qualitative data

In the process of organizing and analyzing our data, we determined different factors that contribute to how we should approach this data. The first factor is the organization of our data categories, the second factor is considering the time period, and the last factor is regarding how varied the data will be, since we not only focus on PS5 data, we also focus on PS4 data as a basis for comparison. Thus we determined the type of our qualitative data to be interval data.

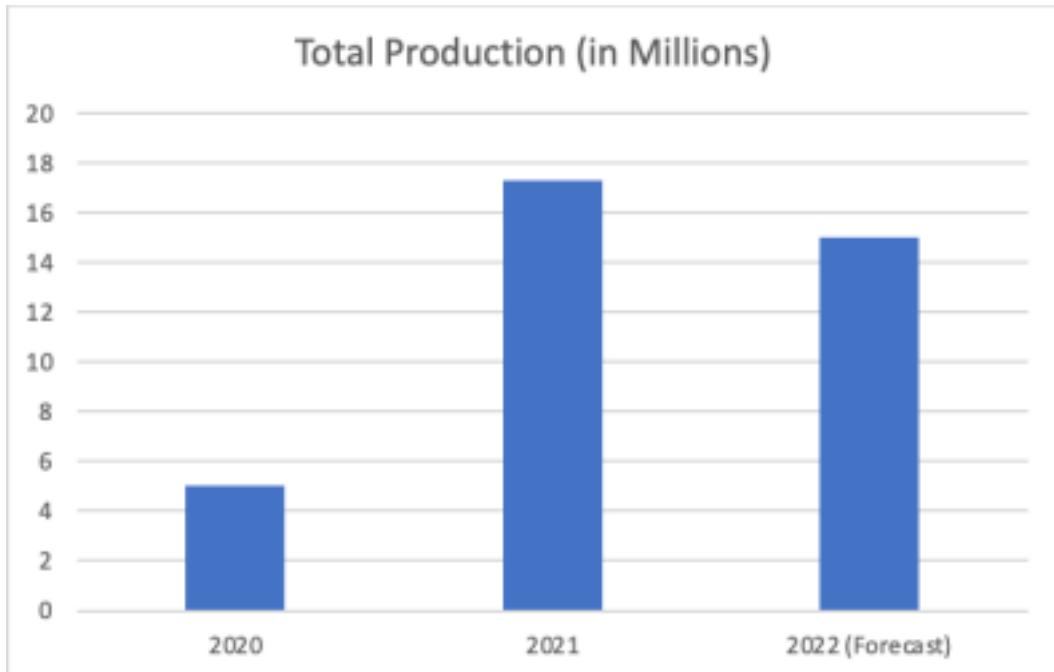
To start off with our analysis, below is our compiled data of Playstation 5's frequency table in which it encompasses the total sales, retail sales, resale purchases, total production, official price, and resale price for Playstation 5:

Year	Global Sales & PPI							
	Total Unit Sales (in Millions)	Official Home Purchases (in Millions)	Resale/Digital Purchases Estimates (in Millions)	Total Production (in Millions)	Average PPI (Sku Version) Price (in USD)	Average PPI (Digital Version) Price (in USD)	Average PPI (Sku Version) Resale Price (in USD)	Average PPI (Digital Version) Resale Price (in USD)
2020	4.0	4.0	0.0	5			1,000	800
2021	10.0	7.0	2.0	17.0			800	600
2022 (Actual)	15.0	10.0	5.0	18			700	500
2023 (Project)	18.0				400.00	300.00		
2024 (Project)	19.0							

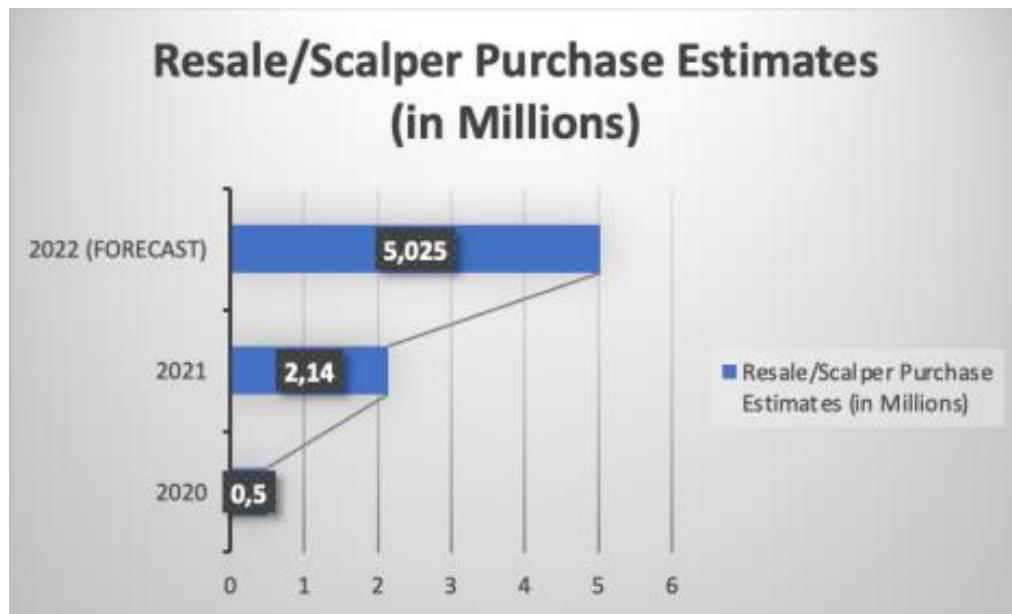
In this data, we aim to understand the progression of PS5 from its initial release on November 12 2020 until the most updated data for 2023. It is understandable that our data does not range as far as we hoped, but we believe that this data can be used to analyze PS5's sales. We try to make an emphasis on how these different categories relate to each other, the analysis of it will be broken down into different sections in our analysis below.



Let's start from the total sales, as mentioned before, PS5 was launched on November 12 of 2020, entering the last quarter of that year, meaning that the number presented in its initial launch of 4.5 Million units sold is only the beginning of PS5's success. It is worth noting that the data we collected is cumulative data from its initial launch until the most recent data. The PS5 launch was a challenge for Sony, not only that the pandemic was expanding at that time, the pandemic also caused shortage of supply for Chip. Electronic components were having trouble in its production due to the pandemic, this relates to PS5 sales in the year of 2021. Although production was slow, it did not stop customers from purchasing PS5, its low supply and high demand situation towards PS5 products identifies PS5 as a luxury good. Sony is still very optimistic about PS5 sales as it became the fastest selling product of Sony from 2020 to 2021, it leads to Sony's forecast of PS5 sales in 2022-2024 with a steady growth of 16,7 Million sales each year from 2022-2024.

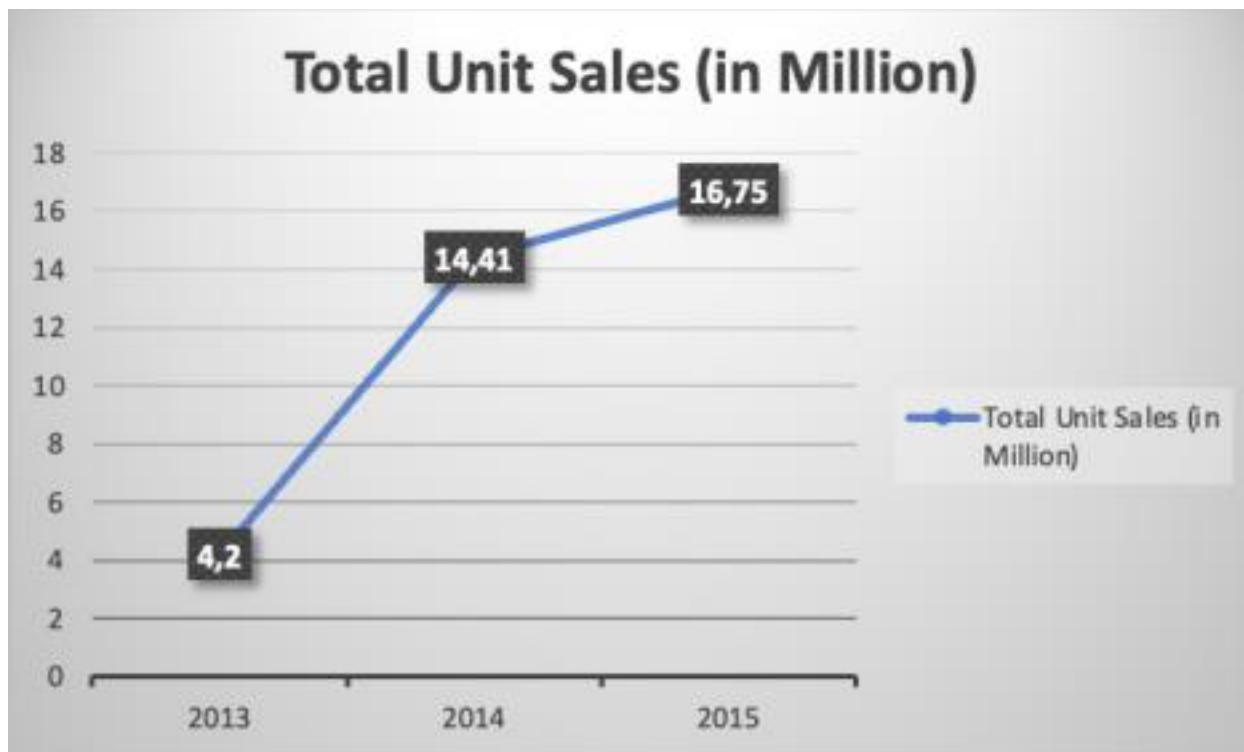


The issue of supply shortage was mentioned in the previous section, but from this data of total production for PS5, it can be seen that initially the production of PS5 was quite good, until the Chip shortage that forced Sony to dial down its production in 2022. Sony's plan for production in 2022 was aimed at more than 16 Million units produced, but the shortage forced them to reduce that number to only 15 Million units.



Diving into the demand aspect of this data, it can be seen from the graph above that because PS5 is a product with high demand, scalpers or resellers are taking this opportunity to gain

advantage of the situation. In 2020 the amount of resale purchases was counted at around 500 thousand units, with a price that resellers set at \$900-\$1000, this massive price is twice as expensive than the original price for PS5 that ranges between \$399,99 for the digital version of PS5 and \$499,99 for the disc version of PS5. This data will help us in making the reader realize that purchasing PS5 at launch was very hard or expensive considering the lack of supplies. In 2023 It was forecasted that the total purchase for resale PS5 is around 10-15% of the total PS5 purchase, making it harder for customers to purchase PS5 with its normal price.



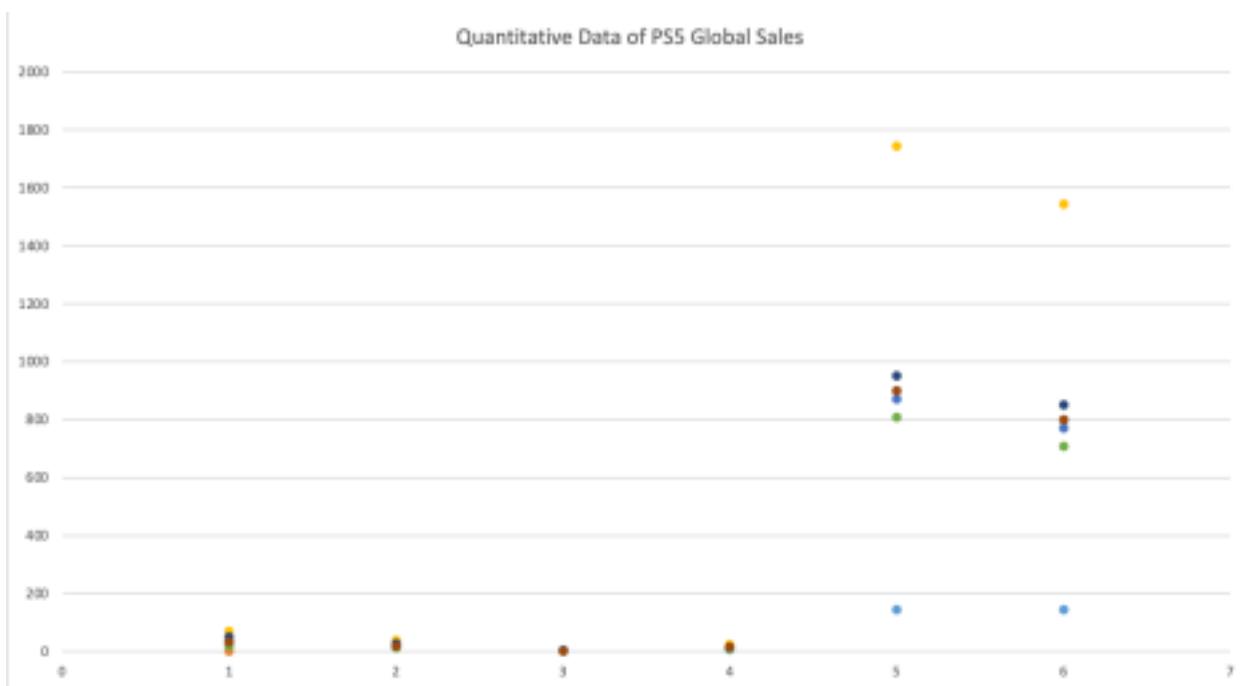
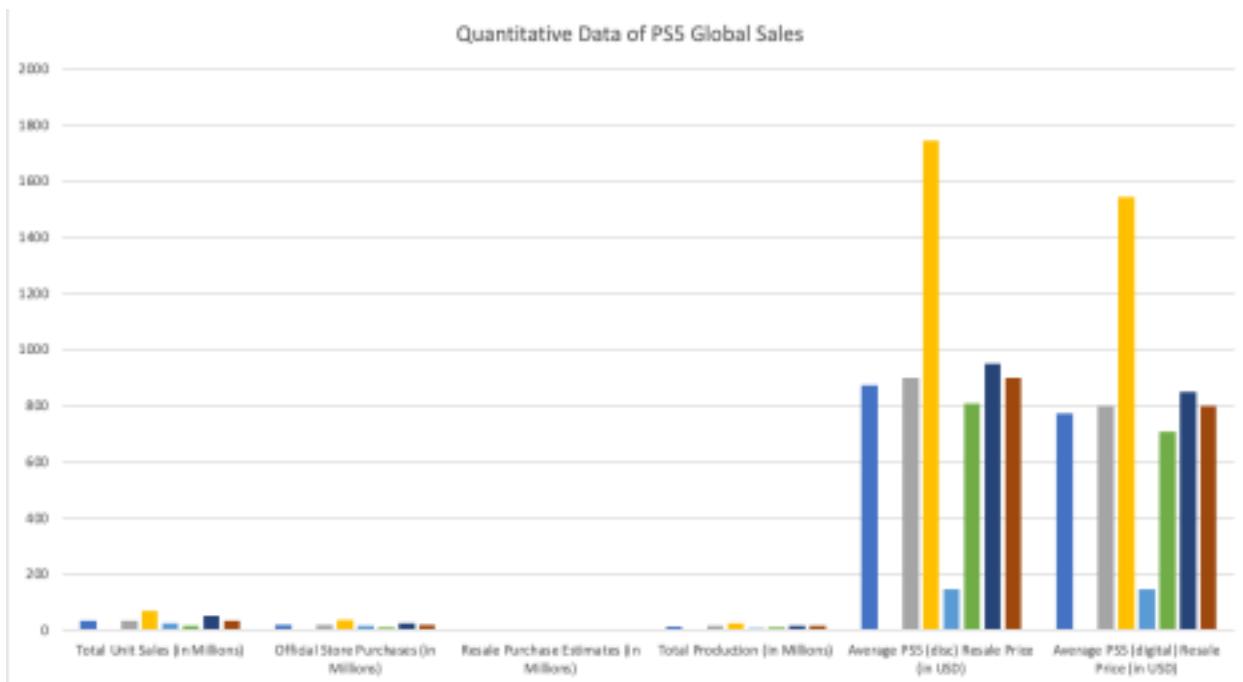
Even though many issues surrounded PS5's launch, we would like to compare the initial launch of PS5 to the initial launch of its predecessor, the PS4. The data above shows the total sales of PS4 during its first 3 years of operation, the growth of PS4 sales is not reaching the success of PS5, but the long term sales of PS4 is another aspect to be considered. Knowing that the PS4 launched at a time when there were no pandemic which smoothes the production of PS4, PS5 still excels in sales when we see this graph of PS4 total unit sales.

3.2 Quantitative data

From our qualitative data, we are able to create our quantitative data which is shown below:

	Mean	Mode	Median	Variance	St. Deviation	Quartile 1	Quartile 2	Interquartile (Quartile 3)
Total (In Millions)	34.52		31.5	10.34	25.33000007	11.1	10.2	11.5
Digital Sale Purchase (In Millions)	18.39000007		21.0	20.24	19.81141207	11.1	20.7	21.0
Total Purchase (Currency In Millions)	1.975		1.94	5.11	2.75984176	1.11	0.5875	1.24
Total Sale (In Millions)	12.41333307		12	20.08	6.38867962	10	18.13	11
Average PS5 Disc / Digital Price (In £GB)	87.16666667		86	1,741.40	146.1919475	86.15	90	90
Average PS5 Digital Resale Price (In £GB)	97.16666667		95	1,944.00	196.3973455	95.5	98	99

From this quantitative data, different elements are shown. The first element is Mean, in our statistical analysis, Mean will be used to find the average, this average number will be utilized as our benchmark of the number to give a general idea whether the number shows a small or large scale of our category. The second element is Mode, mode is used to find the most common number in our data, since our data is varied, mode cannot be found within our data. Median is our third element which finds the 'middle' point of our ranged data, this middle point will form a goal benchmark of our analysis, if the average of our data surpasses the median, it means that our data shows a positive progression, and from this point on it can be seen that Playstation 5's state shows a positive trend since the average surpasses the median. It leads to our fourth element, Variance. Variance shows how interconnected the data is based on its range, in the case of our data, the variance shows a heavy connection between the range of data that we have. After getting the variance, we can now find our fifth element, standard deviation, where as variance shows the connection between data, standard deviation shows how varied our data is, in this aspect we would like to take a close attention to our average resale price for both disc and digital version, both shows the same number, meaning that the varied range of average PS5 disc version resale price is the same as average PS5 digital version resale price, both have the same range which makes the standard deviation to be the same. It leads to our last 3 elements, quartile 1, quartile 2, and quartile 3, quartile 1 shows the middle point of the first half of our data range and quartile 3 shows the middle point of the last half of our data range. Quartile 2 is essentially the same as median, these quartiles are used to understand the benchmark that Sony has to reach, Quartile 1 shows the lowest situation, Quartile 2 shows the standard situation and Quartile 3 shows the highest point of their situation. This quantitative data is very beneficial for us to explore many aspects surrounding PS5.



The chart above shows how our quantitative data will be formed into charts that can be analyzed purely based on raw data. It shows how each element is distributed which tells us the many aspects of PS5 situations.

4. Message

From the data we get, sales of Playstation always have a market under the auspices of Sony, as the best console games that are debated along with Xbox. Sony still has stable growth in the Games and Network services segment, the profit growth from Sony in this segment has touched 14 Billion USD based on Sony's data. Although other segments experienced fluctuating ups and downs, the Games and Network Services segment was steadily and steadily growing, even though in 2020 there was a COVID-19 pandemic. It's just that the sales of this segment decreased slightly by only 5% in total (not only playstation but also games services) in 2019 but not significantly, as seen due to market factors waiting for the PS5 to release, because the PS4 has been around for too long on the market.

2023 PS5 is still going strong as an option to buy because it has only touched the first 3 years, while PS4 which has been around since 2013, in the first 3 years the PS4 experienced a significant increase in sales, due to budget factors from the market that still consider the PS3 and also product development that is getting worse. good. In 2023, the projected profit from the PS5 forecast will increase by 45.20 Million USD from 2020 when it was launched. It is worth noting that Sony made a bold strategy after they launched the PS5, their strategy is to discontinue the production of PS4 which boosts market demand even more towards PS5 which still has low supply.

Therefore, PS5 sales in 2023 or the third year this product is on the market, is still a discussion that should be considered for Sony and its customers. From the consensus of our group, PS5 is the best product to purchase in terms of next generation consoles, but with the situations surrounding its rough launch due to lack of supplies, and seeing how the progression of PS5 sales is increasing, we suggest that customers should be ready for the next batch of PS5 coming in 2023, as it would meet its production standard which encourages official store purchases instead of resale purchases.

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ISBN 978-623-09-2937-3

