PalArch's Journal of Archaeology of Egypt / Egyptology

RESTRICTION ON PUBLIC TRANSPORTATION REFACE A QUALITY AIR POLLUTION INDEX DURING COVID-19 IN INDONESIA AND THAILAND

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Eko Priyo Purnomo, Yusriah Dzinnun, Lubna Salsabila. Restriction On Public Transportation Reface A Quality Air Pollution Index During Covid-19 In Indonesia And Thailand -- Palarch's Journal Of Archaeology Of Egypt/Egyptology17(8), 440-452. ISSN 1567-214x

Keywords: Covid-19, Air Quality Pollution, Government Policy, Public Transportation, DKI Jakarta, Bangkok City

ABSTRACT:
During the coronavirus spreading around the world, the government made an instruction that citizen to lock down and stop the rope of spreading the virus. This paper will be explained before and after the coronavirus affect the air quality. However, DKI Jakarta and the city of Bangkok have similar problems in increasing transportation, which causes high traffic congestion, and the high number of populations in both regions. This paper using a qualitative method to breakdown the main topic used secondary data and descriptive data analysis. This paper also supports the publicly available air quality data provided by the World'sWorld's Air Pollution Index. The finding of this study also shows that DKI Jakarta has succeeded in overcoming air quality health problems which are a common problem every year, now with the implementation of policies governed by the Governor of DKI Jakarta, this drastically decreased, meaning that the air quality in DKI Jakarta during this pandemic has good value for the health of the local community. But this is different from the city of Bangkok because, after lockdown for 30 days, Bangkok'sBangkok's capital is still occupying a moderate level, which means it is in a cautious value on the air quality in this Bangkok city. The novelty showed in the different perspectives of worse time during COVID-19 to spreading a positive thought that instead of COVID-19 gave a restriction in all lines of our activity, but in the right way, COVID-19 is a solution to healing a good air quality for a sustainable world.

INTRODUCTION

This paper will be explained how the coronavirus issues nowadays work to increase the quality of air pollution in DKI Jakarta and Bangkok as the sample case in ASEAN. Both cities, DKI Jakarta and Bangkok, are the higher big cities in ASEAN that have a significant population (Koo, Wong, Selvachandran, Long, & Son, 2020). Obviously, during the coronavirus spreading around the world, some of the countries make an obligation that needs more protecting their land and citizen to lock down and stop the rope of spreading the virus. One of the positive effects of coronavirus is the pollution index in the big country from January to April 2020 (Sanober & Usha Rani, 2020). The deep particle of air pollution is the entry or insertion of substances, energy, and other components into the air caused by human activities. That way, the air quality drops to a certain level that can cause or affect human health. Air pollution can be caused by natural sources or social activities such as factory activities so that motor vehicle activity is rife (Cheung, He, & Pan, 2020).

According to Air Pollution Agency, Air Pollution Standard Index is a number that still needs a unit that describes the condition of ambient air quality at specific locations and times issued by the Indonesian Ministry of Environment and Forestry. In big cities, air pollution in general, 70% comes from transportation, namely motor vehicle emissions (Hidayat & Syafitri, 2016). In Indonesia, the growth in the number of motor vehicles in DKI Jakarta reached 6.48%, which is around 20 thousand motor vehicles (BPS, 2018), while in Thailand, it reached 17 thousand motor (Arifwidodo & Chandrasiri, 2020). Also, the influence of air pollution in the two big cities has an impact on increasing traffic congestion and affects the economy and health (Shah et al., 2013).

In 2019 is the highest peak of air pollution in DKI Jakarta and Bangkok resulted in mass protests and bilateral action between several neighboring countries such as Malaysia and Singapore. However, this changed immediately with the emergence of a virus called the coronavirus at the end of 2019. Even though DKI Jakarta and Bangkok experienced delays in instruction to respond to the global pandemic that occurred in several countries around the world. With the emergence of a worldwide epidemic, this has a good impact on improving air quality in DKI Jakarta and Bangkok, although there has not been a good change in public health factors

LITERATURE REVIEW AND HYPOTHESIS

Based on the air quality index released through AQI in Bangkok, the PM level is 2.5 53 micrograms per cubic meter on average (Chirasophon & Pochanart, 2020). AQI is a general safety standard related to air pollution level standards used by several large countries, especially in Thailand. The area with the lowest PM 2.5 level is the Samut Prakan province. Air pollution in Bangkok has been a consistent problem during 2010-2019; throughout the year, dangerous air quality has exceeded 100 AQI (Uttamang, Campbell, Aneja, & Hanna, 2020). According to Arifwidodo & Chandrasir (2020), Bangkok city has stayed as the third-ranked most city with the highest pollution in the world in January 2020, according to Airvisual.com. While the haze has been a common phenomenon in the side North and Central Thailand with more than a decade, it usually occurs from January to April. Still, it will peak in March because of arid conditions that

increase the severity of forest fires. This is intensified by farmers who burn waste to clear land for the next harvest season (Arifwidodo & Chandrasiri, 2020). In 2020, the air quality in Bangkok has improved its air quality, decreasing the pollution and environmental impact regard of COVID-19 spreading the virus (He, Pan, & Tanaka, 2020).

In the other hand, DKI Jakarta also had the same problem with Bangkok, that traffic jam is the first worse thing to increase the higher number of pollutions. DKI Jakarta is included as the fifth most polluted city in southeast Asia after Bangkok city; these issues almost the same regarding the population in DKI Jakarta and Bangkok, virtually in the same level of average (Aqil, 2020). But the Indonesian government appears reluctant to acknowledge the problem (Lamb, 2019). However, DKI Jakarta improves, since the Indonesian government made a policy to keep stayed at home most of the time to prevent and decrease the spreading COVID-19 in all lines, DKI Jakarta slightly improve in air quality (Aqil, 2020). The DKI Jakarta environment agency reported that the air quality had been enhanced since the ordered physical distancing urged offices to suspend operations and limited public transportation works since March 23 as part of the Covid19 emergency measurer (Yuwono & Sari, 2020). According to the environment agency's data, the concentration of PM 2.5 particulate matter, inhalable pollutant particles less than 2.5 micrometers in diameter was below 40 micrograms cubic meter down from more than 60 mcg/cm (WAQP, 2020).

Therefore, the preventing of COVID-19 indubitable affected the quality of air pollution, especially in decreasing using public or private transportation, the government has their power to decide to build the improvement of quality air pollution instead of preventing the spreading COVID-19. This paper will explain the face before and after the coronavirus affects air quality. Besides all the effects those coming, the government has their hand to make it works instead of preventing spreading the COVID-19 in all lines between DKI Jakarta and Bangkok. This paper also will show you the significantly reached good health air quality and decreasing the hazardous air pollution in both cities, within finding the government action to make it works at the same time.

RESEARCH METHODOLOGY

METHOD AND DATA

This paper using a qualitative method to breakdown the main topic with used secondary data and descriptive data analysis. Also, this paper supported by the publicly available air quality data provided of the World's Air Pollution Index: Real-Time Air Quality Index (WAQI project), which curates air quality data collected from > 12.000 ground-based air quality monitoring stations with two countries in January to April 2020. It must be noted that the data from WAQI are from the stations managed by a government agency or any institution of the respective country and may not always be fully validated (Kasiwi & Nurmandi, 2018). We used daily concentrations of air pollutants collected from multiple WAQI stations that were available for further analysis. The data of this paper gathered the lockdown dates for in DKI Jakarta and Bangkok. The 'lockdown' of each city has different treatments. At the same time, this paper meant restrictions on vehicles, commercial flights except for cargo and charter, and prohibitions of commercial activities except for essential services, resulting in a temporary shutdown of air pollution sources from these activities. Although

this paper cross-verified the accuracy of the starting dates of lockdown by both cities DKI Jakarta and Bangkok. As times of lockdown vary, this paper also examined the daily changes in concentrations of these air pollutants from January to April 2020 to investigate the effect of lockdown on their daily air pollutants through linear regression using lockdown as a dummy variable. Not only the improving quality of air pollution but on the other side, this paper also will declare and find the supporting system of quality air pollution in DKI Jakarta and Bangkok instead of decision making from each government. This paper will also explain the significant grafis of government policy during the global pandemic since implementing the lockdown policy in DKI Jakarta and Bangkok.

RESULT & DISCUSSION

The Air Pollution in High-density Urban Area

Natural events contributing to pollution include volcanic activity, forest fires, and storms [1]. Air pollution can be from natural and human activities, including combustion or dissemination of dust [2]. Many geographers consider that we are in the Anthropocene, which refers to the era in which the essential characteristics and environmental factors of our planet are directly affected by human activity [3]. Human activities have significantly influenced the Challenge of Air Pollution in High-density Urban Areas Throughout the past 150 years since the first industrial revolution in the 19th century, the Earth and its environment. Air pollution and urban environments are products of human activity [4].

Regarding determining the level of air pollution standard index values applied by several countries, it is necessary to have categories and classifications of the various levels of air pollution in the world. Some states have used the air pollution standard index values applied by WAQI, both as a race in determining the level of air pollution in a state or a particular city. The following are the air pollution standard index values issued by [5]:

Tabel 1: Standard Index of Air Pollution

Air Qualitification	Value Numerical	Risk of Public Health
Good	0-50	Air quality is satisfactory with little or no risk to the community
Moderate	51-100	Poor air quality, some sensitive individuals can experience several problems
Unhealthy (for sensitive groups)	101-150	Subjects belonging to sensitive groups may experience the effects of symptoms that endanger their health
Unhealthy	150-200	All subjects may begin to experience health effects. Members of sensitive groups may experience major health risks.
Very Unhealthy	201-300	State alarm: all parties may be subject to significant health risks

Hazardous	>300	Emergency state. All residents can be exposed to health risks with a high probability

Source: WAQI, 2019

In other words, the spatial form itself is not affected by the wind environment or air pollution and is solely a product of human activity [6]). Because of the pantry, there are cooking operations that can increase CO and CO2 levels in the air. Infection in the respiratory system is the most frequent health impact due to air pollution from natural events and human activities [7]. Some of the prevention activities were making regulations to reduce air pollution emission including control of the no-smoking area, management of threshold limit values for vehicle emissions, emission monitoring, maintenance for the vehicle, enforcement for industrial discharge, project on mass rapid transportation in some big cities, and increasing energy from a renewable source [8]. The daily, weekly, and monthly variations of each pollutant could be related to urban activities differently by location sources and time of the emission. In contrast, the monthly difference may also represent the weather condition's influence on the characteristics of the pollutants. The different number of peak hours means that the locality, such as traffic intensity, urban activities, and local meteorological conditions in each area, probably had a role in determining the characteristic of the particulate matters' concentration at each station.

In general, besides vehicle factors and human activities, meteorological factors also greatly influence the PM2.5 concentrations, for example when air temperatures rise and wind speeds are relatively stable, then pollutants will also be carried out to spread until the wind conditions reach the minimum rate or calm [6]. Given that air pollution causes more than four million premature deaths annually, the declines in air pollution in response to activity changes confirm that governments can improve air quality through policy change [9].

In another way, Alterations of human transport and industrial activity are usually the results of long-term economic and behavioral change and challenging to legislate under typical situations. However, the analyses presented here require further investigation as governments increasingly restrict activity world-wide, and some are discussing the possibility of prematurely lifting restrictions to spur economic growth. Further, the data analyzed here present point estimates of air quality. Air pollution impacts are not homogeneous through urban landscapes and are influenced by spatial variation in industrial activities and transportation [10]. Most of the pollution in Indonesia is from the transportation sector (80%), followed by emissions from industry, forest fires, and domestic activities. Economy refers to all the individuals' consumption and production activities. In small countries, having a capital city that doubles as the center for economic, cultural, and entertainment activities may prove diligent [11].

Air pollution also causes adverse impacts on society, the economy, and the environment, including climate change. It is, in fact, significant public health, environmental and developmental challenges of our time [12]. Therefore, understanding this temporary improvement in the air quality at the planetary scale provides a unique opportunity to study processes and implications of policy changes to reduce air pollution. Typically, air quality is evaluated by measuring

the atmospheric concentrations of six pollutants: delicate particulate matter (PM2.5, the mass density of particles with diameters ≤2.5 um), coarse particulate matter (PM10, the mass concentration of particles with diameters ≤10 um), ground-level ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), and carbon monoxide (CO) [13]. All of them except O3 have primary sources, such as combustion sources as automobiles and industries. At the same time, O3 is formed in the atmospheric from precursor gaseous species, emitted mostly from primary sources, in the presence of sunlight [14]. Therefore, we selected PM2.5, PM10, NO2, O3, SO2, and CO to investigate the changes in air quality among cities before and during lockdowns [15].

The Path of Air Pollution Quality Through Covid-19

The global pandemic in 2020 is become huge worse in the past decades after the pathogens, other diseases such as Ebola, MERS, and SARS. During the globally pandemic virus Covid-19 around the world, not only decreasing the effectivity and productivity of global economic, but also the Covid-19 affected to another aspect such as public health, education system, the government administration process, and impact to retirement in a big company that will increase the number of jobless and economic immune [4]. Newly evolved CoVs are thus posing a significant threat to global public health. Over the past two decades, the current emergence of COVID-19 is the third CoV outbreak in humans [16]. The COVID-19 that emerged in China spread rapidly throughout the country and subsequently to other countries. Due to the severity of this outbreak and the potential of spreading on an international scale, the WHO declared a "global health emergency" on January 31st, 2020. Subsequently, on March 11th, 2020, a pandemic situation was reported. The WHO said the crisis a global health emergency on January 30th due to the virus's spread outside China. Infections have now been recorded in 29 other countries, including Japan, Thailand, Indonesia, the US, Canada, France, Italy, Germany, and the UK [17].

With the most massive pandemic global issues that come to Southeast Asia in recent days have increased doubts over a theory that warmer weather could stem the spread of the virus, health experts say [9]. The number is relatively low if we compare with other developed countries, but still, this is the massive surge for the state who lives in southeast Asia that mostly their economy is in the middle-class level. Surprisingly, Indonesia, Thailand, Malaysia, and the Philippines have recorded their highest rate of infections in recent days as testing has ramped up. In a sign, seasonal factors may only play a limited role in coronavirus' spread.

The COVID-19 pandemic reveals just how serious governments take this responsibility and that restricting activity to limit pathogen spread can have other public health repercussions. This combined agent has in vitro activity against the SARS-CoV and appears to have some action against MERS-CoV in animal studies. Nonetheless, the lockdown has halted all forms of transport (flights, trains, automobiles), factories, shops, markets, and other economic and social activities significantly.

Figure 1: The Level of Air Quality Pollution in Jakarta and Bangkok, 2019

Source: TomTom Traffic Index, 2019

Based on TomTom Traffic Index data, the level of congestion in Jakarta when implementing a stay at home government policy was reduced by 50%. For example, during peak hours, around 05.00 PM, congestion can reach up to 88%. But in April 2020, the traffic jam was only 19%, meaning that there was a decrease in air quality improvement in Jakarta by 69% [18]. This is also the same in Bangkok City, wherein 2019, the air pollution level was 53%, and it experienced an improvement of 15%.

Since the advent of the Covid-19 virus, millions of people have been sheltered to curb the spread of the Coronavirus in the interest of public health, the largest accidental air quality trial underway. Since this begins in 2020 in cities around the world, the number of us who have never been on the road, living at home from work, and limiting our activities like never before, the impact on air quality becomes evident. This Earth Day, such an achievement, seems bitter: that a phenomenal increase in air quality coincides with the loss of millions of jobs and thousands of lives after today's most massive global pandemic.

Jakarta's Air Quality Pollution: is Covid-19 recovered the Good Air Quality?

Regarding of the outbreak of the COVID-19 virus in various lines of society, the provincial government of DKI Jakarta has issued a government policy that needs to be anticipated by the public. Systems that arise due to the coronavirus outbreak can be seen with the closure of several access roads in a specific time, restrictions on the amount of transportation, restrictions on operating hours of transport, which of course is a policy to restrain the pace of community activity from getting out of the house. This policy is called Large-Scale Social Restrictions (PSBB). With the application of this PSBB regulation, efforts will be made to prevent the spread of the COVID-19 virus to various regions, so that people living in that region can avoid the outbreak.

This PSBB policy has been regulated in Law No. 6 of 2018 concerning Health Quarantine, which addresses Health Quarantine at the Entrance and in the region through disease observation activities and Public Health Risk Factors for transportation, people, goods, and the environment, as well as responses on public health emergencies. Then the government also provides specialized services that can be accessed by the public related to the spread of the

Coronavirus to avoid public panic due to news hoax that is already circulating among the public. Referring to the ITE Law, in Article 45A paragraph (1), everyone who intentionally and without the right to spread false news and misleading was sentenced to a six-year prison term and a maximum fine of 1 billion rupiahs.

PSBB activities are the policy of the Governor of DKI Jakarta based on number 5 of 2020 concerning Temporary Dismissal of Worship and Religious Activities in Worship Houses to Prevent the Spread of Corona Virus Disease (COVID-19). With the PSBB policy being applied to all lines of society, of course, there will be a positive impact arising that the government can reduce the number of people affected by the COVID-19 virus by efforts to minimize activities beyond maintaining a high risk of transmission, other than that other positive impacts that arise indirectly namely reducing air pollution, considering the number of user in DKI Jakarta is quite high [19]. The following is data that shows the positive impact of the emergence of COVID-19 and the application of PSBB in improving air quality pollution for the better in 2020.

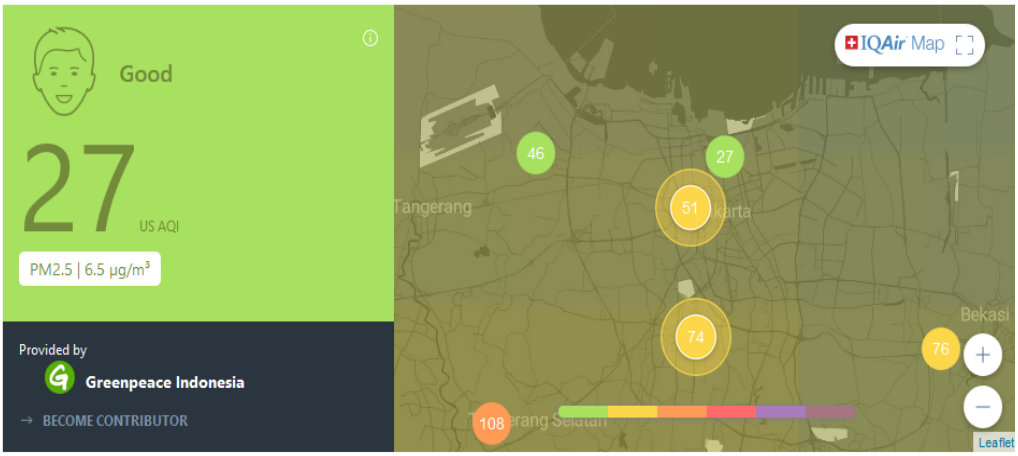

Figure 2: Jakarta's Air Quality Pollution in April 2020

Sources: IQ Air Index Pollution, 2020

If comparing the effect of Covid-19 on the use of transportation in Jakarta on 29 April to 5 May 2020, it shows a very significant number either, the positive impact of the rise of Covid-19 also has a health effect on the society where the people of DKI Jakarta have high levels of disease. The most upper pneumonia in Indonesia in 2019 was 902,886 people caused by air pollution [20].

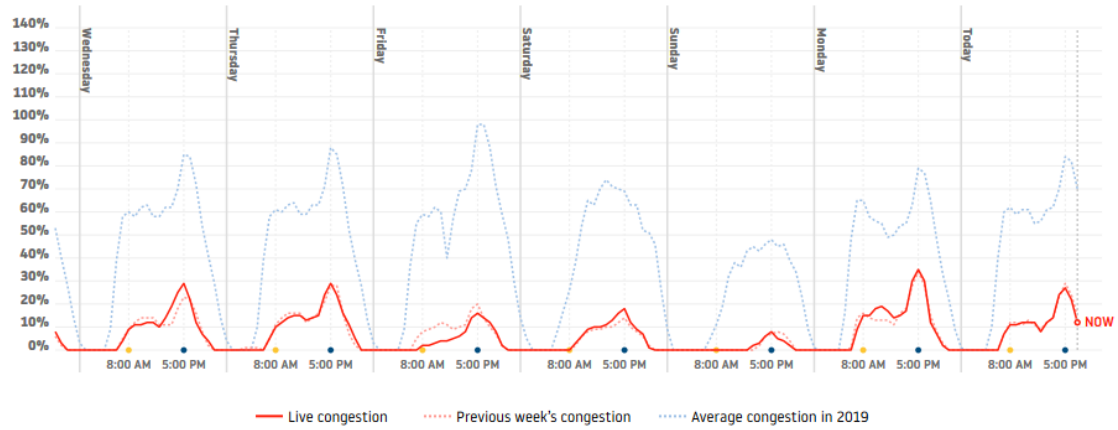

Figure 3: Level of Public Transportation Use in Jakarta on 29 April- 5 May 2020

Source: TomTom Traffic Index, 2020

Regarding the level of public transportation use in Jakarta on April 29-May 5, 2020, this is aimed at a very significant decline compared to 2019. When viewed in terms of air pollution and transportation, this is the best record in history that the DKI Jakarta government has been able to alleviate air pollution. Besides lockdown, other efforts by the government also prepare hand sanitizers in several public areas for the community to be used after contact and always remind them to wash hands to avoid viruses entering the body.

Bangkok's Air Quality Pollution: is Covid-19 recovered the Good Air Quality?

The city of Bangkok regularly has unhealthy air pollution for children, the elderly, and people with respiratory and other health problems. Sometimes also crossing into areas that are not healthy for the wider community. Despite a longstanding problem, Bangkok's air pollution has recently begun to enter public awareness. This awareness was triggered by several foggy, prolonged spells that tested the public's patience and encouraged schools, organizations, and individuals to begin testing their air. In January 2019, there were already more than 100 schools using air sensors. The growth of these non-government air monitoring stations gives the first time more parents and Bangkok residents real-time pollution data, revealing how poor the air quality is of Bangkok. But in this case, the city of Bangkok has a more profound concern for more monitors reporting real-time air quality data than any other city in the world: more than 1,000. This has enabled residents to get timely, accurate, and hyperlocal information about the air they breathe and protect themselves, such as wearing masks or reducing outdoor sports.

The solution carried out by the Bangkok government in raising public awareness about air pollution is a critical step in resolving the problem. Easy and up-to-date access to air quality data has enabled individuals to take corrective actions to protect themselves and advocate for better air. At the same time, the US Environmental Program and the Clean Air and Climate Coalition are working with Thai authorities to tackle air pollution through initiatives such as raising vehicle emission standards and changing electric *tuk-tuks* (motorized rickshaws) everywhere in Bangkok.

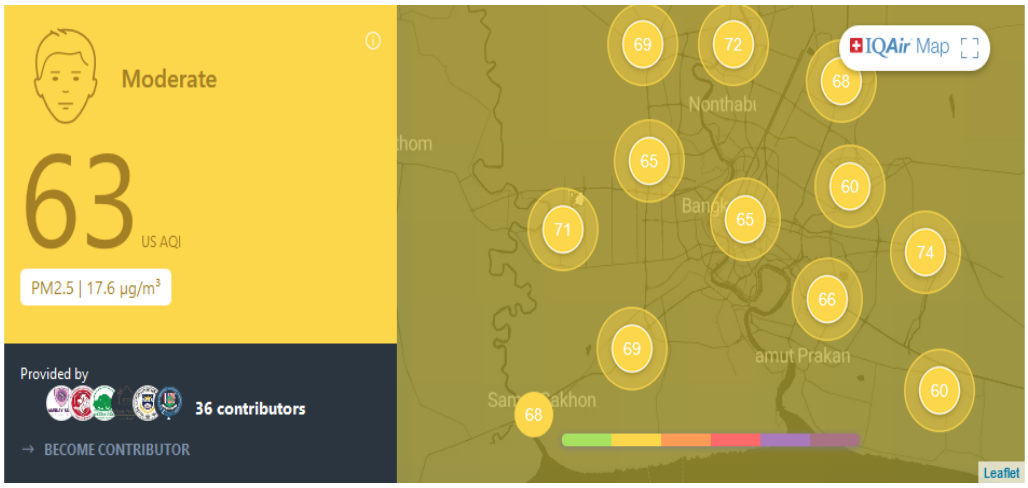

Figure 4: Bangkok's City Air Quality Pollution in April 2020

Source: IQ Air Index Pollution, 2020

Although related to the existence of air pollution in the city of Bangkok did not experience a very significant decline, but the government of Bangkok continues to monitor and monitor the condition of the distribution of Covid-19. With the high level of air pollution in the city of Bangkok, it means that there are still many people who have not enforced the lockdown that has been made by the government. The number of air quality pollution in April 2020 in Bangkok reached 63 US AQI, which means the level of corruption in Bangkok is still at a moderate value. The lockdown that was implemented by the Thai government began on March 25, 2020, and ended on April 30, 2020, with this joint decision constituting the application of a national emergency status to stem the spread of the Covid-19 outbreak.

The Kingdom of Thailand was the first country to confirm a case outside China in January, but additional steps were taken because of a weak economic dependence on tourism. But festive ceremonies, such as weddings or family activities, can continue under the rules issued by the government in the middle of the Corona COVID-19 pandemic [10]. The Thai Minister of Trade said on April 17, 2020, that in anticipating difficulties in people's purchasing power amidst limited mobility, the Thai Government had issued a policy to reduce prices for 72 types of food items and household needs ranging from 5-58%. Government policies to help and ease the burden on society apply from April 16, 2020, to June 30, 2020. This policy of reducing food prices and household needs is not affected by falling oil prices but has lowered logistical costs ranging from 1% - 3%. Lower rates for consumer goods apply, among other things; rice, palm oil, instant noodles, milk, soap, shampoo, frozen food, toothpaste, toothbrushes, and others explained in the Kingdom of Thailand's policy.

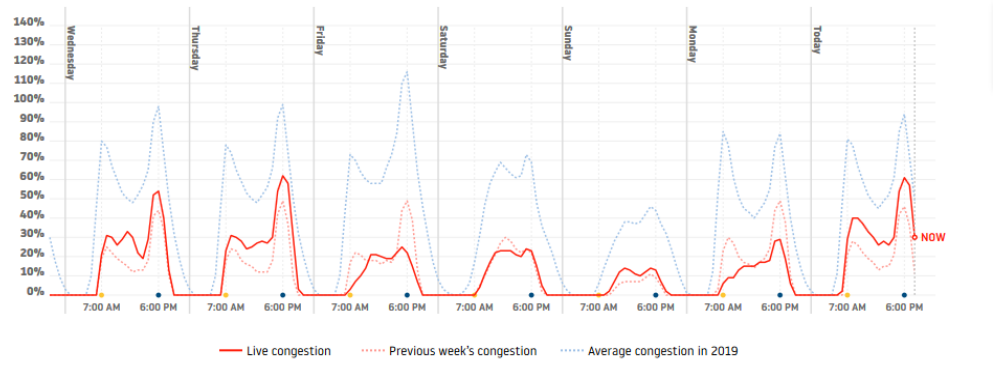

Figure 5. Level of Public Transportation Use in Bangkok City on 29 April- 5 May 2020

Source: TomTom Traffic Index, 2020

The congestion value that occurs in the city of Bangkok does not have a significant influence like what happened in Jakarta, because the Thai government does provide concessions to the implementers of the market economy to continue implementing and carrying out their economic systems because the Thai government realizes the weak economy of the people in Bangkok.

CONCLUSION AND RECOMMENDATION

CONCLUSION

The congestion value that occurs in the city of Bangkok does not have a significant influence like what happened in Jakarta, because the Thai government does provide concessions to the implementers of the market economy to continue implementing and carrying out their economic systems because the Thai government realizes the weak economy of the people in Bangkok.

LIMITATION OF FUTURE SCOPE

This comparative analysis of image retrieval techniques was carried out and the results obtained were successful. However, a further enhanced framework can be proposed to improve the accuracy of the searched image. This research will help the reader to understand how was COVID-19 gives a positive path in our living, instead of worse time on economic and industry for each country. This research showed in the different perspectives of worse time during COVID-19 to spreading a positive thought that instead of COVID-19 gave a restriction in all lines of our activity. In the right way, COVID-19 is a solution to healing a good air quality for a sustainable world.

CONFLICT OF INTEREST AND ETHICAL STANDARDS

There is no conflict of interest with the present organization and no unethical practices followed in the completion of this study.

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