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DKI Jakarta's Odd-Even Transportation Policy Formulation from The Perspective of Evidence Based Policy

Abstract

This research describes the policy formulation of the odd-even traffic restriction system in DKI Jakarta from the perspective of an evidence-based policy. The odd-even policy seeks to solve congestion and environmental problems due to using private vehicles that have not been fully resolved. The researchers used the concept of evidence-based policy (Head, 2008) to understand three dimensions of evidence, namely political knowledge, scientific (research-based) knowledge, and practical implementation knowledge. The researchers used the post-positivist paradigm in this study to obtain a holistic analysis and to understand the possibility of other variables not discussed in previous theories through in-depth interviews and literature studies. The results show there was stakeholder involvement in the systemic-participatory process limited to NGOs and academics. Meanwhile, business interest groups were reactively involved through mass media support. The Transportation Department of DKI Jakarta had used data and information in the traffic restriction policy formulation with the odd-even system. Limitations in data resulted in the inability to provide a holistic picture related to traffic conditions and the effects of the odd-even policy implementation in DKI Jakarta. Practically, the odd-even policy formulation had shaped the preparedness of the implementing instruments in the odd-even policy implementation. Meanwhile, theoretically, this study found two determinant factors in the formation of political knowledge not stated by Head (2008), namely legal certainty and mass media role.

Keywords:
odd-even traffic system policy; evidence-based policy; legal certainty; mass media role.

Introduction

Jakarta is the largest metropolitan city in South-East Asia, and the eighth in the world (City Mayors, 2019), with a population of 10.5 million (Katadata, 2019). However, the city's burden is not restricted to its

own population only, but also to those of the areas collectively more known as Jabodetabek, comprising Jakarta itself, Bogor, Depok, Tangerang, and Bekasi. The large populations of Jakarta and its buffering areas, most of which consist of circular migrants, have contributed to congestion problems. The DKI Jakarta Provincial Administration has mentioned that during the working hours in the daytime, the population size can reach as high as 14.5 million (Hidayati, 2019). This suggests that over four million conduct circular mobilization daily. This behavior of circular migrants who work in Jakarta and the activity of those who reside in the city have caused an immense demand for modes of transportation. As stated by the DKI Jakarta's Environment Department, 20 million vehicles pass by the city roads every day, 3.5 million of which are private four-wheel vehicles, while the other 13.5 million are two-wheel rides (Antara, 2019).

The great number of circulating vehicles is directly proportional to the Jakarta congestion, which has significantly doubled from 1985 to 2000 and has been predicted to cause an economic loss of Rp65 trillion by 2020 (Harmadi, 2006). In 2010, losses due to fuel inefficiency reached IDR 10.7 trillion, time productivity losses reached IDR 9.7 trillion and private vehicle losses amounted to IDR 1.9 trillion and health reached 5.8 trillion with a contribution of 90% to air pollution in Jakarta (Endang, 2010). Meanwhile, as stated by the DKI Jakarta Governor, the loss dealt by the congestion in DKI Jakarta in 2019 reached a staggering Rp100 trillion (Sari, 2018), pointing at a higher economic loss than predicted in Harmadi's study (2006). Considering the economic losses that arise, the local government must be able to make appropriate and effective public policies in solving congestion problems in the Indonesian capital.

Well before the enforcement of the odd-even policy, the 3-in-1 policy was already in effect, first legalized through the Decision of the DKI Jakarta Governor No. 613 of 1992 on the Establishment of Traffic Control Area and the Requirement to Transport at Least Three Passengers per Vehicle in the Control Area. This policy was revoked by Governor Basuki Tjahaja Purnama in 2016 through the Governor Regulation No. 114 of 2016 on the Revocation of the Governor Regulation No. 110 of 2012 on Social Control Area. This policy revocation was based on evaluating the rampant car jockey practices that came with the 3-in-1 policy implementation which led to child exploitation in DKI Jakarta. This policy failed in maximally mitigating the congestion problems because it was not long-term-oriented nor was it able to face the challenges that arose with its development.

After the revocation of the 3-in-1 policy, the government utilized a different policy called the odd-even system. This policy was first regulated through Governor Regulation No. 164 of 2016 on Traffic Restrictions with an Odd-Even System. The traffic restriction policy through the odd-even system in Jakarta is regulated under the Governor Regulation No. 88 of 2019 on the Amendment to the Governor Regulation No. 155 of 2018 on Traffic Restriction through the Odd-Even System. The odd-even policy has statistically proven its effectiveness in reducing congestion. In 2018, the city ranked first as the city with the most decreased congestion index in the world (8%) year on year (Tomtom International, 2019). An increase in average private vehicle speed is shown by Transjakarta data, according to which there was a 12% increase after the expansion of the odd-even policy coverage area (Sari, 2018). Besides, this odd-even policy has indirectly played a role in the support for the improvement of public transport service quality, in this case, the Transjakarta bus, as seen in the increased Transjakarta bus speed by 25.56%, along with the Transjakarta bylaw of busway route sterilization (Sari, 2018).

Problems in the policy formulation process vary widely and are influenced by various factors. The considerations in policymaking are often

influenced more by political factors than empirical and scientific factors. The odd-even policy itself shows symptoms of this problem, one of which is the non-regulation of two-wheeled vehicles, which is the largest vehicle in Jakarta (73.92%), and its contribution to environmental problems and congestion (BPS Provinsi DKI Jakarta, 2018). Meanwhile, some rejection was still expressed by some community elements according to whom this policy has brought negative impacts on them. For instance, rejection came from online taxi drivers who, according to the Governor Regulation No. 88 of 2019, are not excluded as those who are subject to the odd-even traffic restriction system (Tambun, 2019). The Indonesian Logistic Drivers Alliance (APABI) also expressed rejection, whose mobility grew increasingly restricted by the odd-even system expansion in Jakarta (Prabowo, 2019).

Farazmand (2018) states that knowledge plays a significant role in maintaining and enhancing system integrity and producing and disseminating knowledge has an important role in promoting rationality, character, wisdom, and justice in an era where complexity, contradiction, and chaos increase. Yet, there is a wide gap in Indonesia between the need of the government and state administrators in public policy establishment and political decision-making and the research and development agendas in universities (Prasojo, 2019). Here, as stated by the Head of the State Administration Agency (LAN), the greatest challenge to the Indonesian Government is to produce policies of high quality to reinforce Indonesia's competitiveness with the potentials and resources at hand (Paat, 2016). According to (Head, 2008) in the 1990s, it can be seen that policymaking has the potential to reduce the role of technocrats and is more open to network approaches. This shows that in its development, public policy is no longer the monopoly of the ruler but is advocating for the community interests.

To attain the purpose of tackling congestion and environmental problems it is important to gain a holistic, empirical picture of the problems in the field and the influencing policy. Proving these principles is carried out through the search for evidence obtained from political knowledge, research, and professional and field experience which can solve policy problems (Head, 2008). Cookson (2005) states that evidence-based policy is a policy formulation process based on facts in the community, so policies are drawn up according to the needs and interests of the public. A policy called an evidence-based policy is ideally structured through obtaining and analyzing scientific data, especially through research (Smith et al., 2000).

This paper attempts to analyze the odd-even policy formulation in evidence-based policy. For examining the odd-even policy formulation, this article breaks down the discussion into four parts. First, public commitment is establishment by relevant actors (political knowledge). Second, utilization of scientific data and information (scientific/research-based knowledge). The last, organization's preparedness in implementing the policy (practical implementation knowledge).

Policy Formulation

Dye (2013) defines public policy as whatever governments do or do not do. Public policy as a process is described by Jann & Wegrich (2007) as part of building multidisciplinary perspectives in policy studies. In line with the statements above, Dunn (2018) criticizes public policy formulation discussions focused on choosing and deciding processes for the fundamental essence of the political policy formulation itself. Dunn (2018), citing Richard Neustadt (1960), states that politics and policymaking mostly are about persuasion. Still, he (2012) insists that policy processes remain useful for analytical purposes in the effort to compartment policymaking into its constituent units for a better understanding of how policies are made.

This research is focused on problems in policy formulation and decision-making stages. Policy formulation is the development of policy alternatives to deal with problems in public agendas (Dye, 2013). As explained by Moran et al. (2006), in a public policy formulation arena stakeholders and decision-makers are involved in a never-ending process to influence thoughts and behaviors. The policy formulation process with the odd-even policy was by the researchers understood through the rational-choice institutionalism approach (Hall & Taylor, 1996), which has four characteristics: 1) it uses a set of characteristic behavioral assumptions, meaning this paradigm seeks to understand policy actors' sets of behaviors; 2) it takes policy politics as a collective action dilemma, where every actor has an interest in maximizing his/her benefits, while the organization must produce an optimal collective policy; 3) this paradigm attempts to explain how a strategic interaction influences a policy outcome, in which case the interaction is seen not as historical motivation, but as a set of strategies of maximizing the actors' interests; and 4) this paradigm understands the organization's functions and how the organization serves these functions.

Evidence-Based Policy

Pawson et al. (2003), Schorr (2003), and Davies (2004) in Head (2008) reveal that the evidence base apparently has origins, not in a single source but multiple sources. Evidence in the policymaking context is related to the picture of the complexity involved in public problems that must be tackled by public policies. As stated by Head (2008), the problems encountered by policy-makers are many and varied. Head (2008) goes on to say that policy development arrangements are experimenting with broader relational and systemic approaches. Head's proposed concept (2008) has shifted evidence-based policy from previously technical- now to relational-natured. The evidence-based policy stresses policy as an output of a scientific process, but this discussion should be taken to a larger context due to other influencing variables. Thus, Head (2008) offers three kinds of knowledge and 'evidence-' related perspectives, namely political knowledge, rigorous scientific and technical analysis, and practical and professional field experience.

Political knowledge is the know-how, analysis, and judgment of political actors (Head, 2008). These analyzing and judging activities cover a couple of vital elements relevant to evidence-based policy, namely considering and adjusting strategies or tactics, setting agendas, determining priorities, engaging in persuasion and advocacy, communicating key messages and ideological spins, shaping and responding to accountability issues, building support coalitions, and, certainly, negotiating trade-offs and compromises. To community members, political knowledge is important for ensuring that their interests can be accommodated by the government. To some degree, political knowledge can not only improve their ability to relate their interests to certain public issues but also promote political participation, in which case limitation in political knowledge, coupled with a strong belief in wrong information, can lead them to inappropriate policy preferences (Kuklinski et al., 2000). This prevents from effective accommodation of their interests. Furthermore, limitations in political knowledge can be harmful to the quality of democratic governance (Hochschild & Einstein, 2015). This is linked to the political perspective that policies are more about persuasion and support rather than about objective veracity (Head, 2008).

Head (2008) defines scientific (research-based) knowledge as the product of a systematic analysis of present and past conditions and these trends and an analysis of the causal interrelation that explains such conditions and trends. In the practice and making of evidence-based policies, research-based knowledge is regarded as an external input to relevant research (Haug & Plant, 2016). In scientific settings, scientific disciplines

can both bring about divergences in methodological approaches and offer either complementary or contesting perspectives on complex problems. For this reason, interdisciplinary approaches came into frequent use in the last few decades to solve multi-layered social problems. Forms of scientific (research-based) knowledge result from trained professionals' works through the employment of systematic approaches to information gathering and analysis (Head, 2008). Attention to data quality and consistency is fundamental in analyses that use scientific approaches. This refers to the need to validate what has been known thus far while remaining innovative in developing new research approaches which are solid and reliable (Haug & Plant, 2016).

In the context of current policy and program effectiveness, 'practical wisdom' comes from professionals in their 'communities of practice' (Wenger, 1998) and organizational knowledge related to program implementation management (Head, 2008). These professional and managerial communities, according to Head (2008), sometimes are more segmented than well-connected. They work within and across the public, private, and non-governmental organization (NGO) sectors. Classification of relevant professionals includes program implementation managers, contract managers, corporate managers, and various other professionals and para-professionals involved in direct services provision (Pawson et al., 2003) or those who provide support services related to government policy programs (Head, 2008). (Kustermans, 2015) explains that practical knowledge is a skill developed through experience. What is done will generate new knowledge in one thing a person operates, along with its impacts and future. Head (2008) also states that practitioners in program implementations are bound to systematic standards and guides. In major organizations, the standards and guides are underpinned by bureaucracies and protocols.

Table 2.
Concept Operationalization

Dimension	Dimension Definition	Indicator
Political Knowledge	The knowledge of a political actor in construing policy problems by interest	1. There are priorities and ideological values that influence policies. 2. There are a participative system and a participative process in the policy process. 3. There is a political commitment to the policy from every interest group. 4. Strategies and tactics are in place in the policy process undertaken by the DKI Jakarta provincial administration. 5. There arise debates and conflicts of interest along with their resolutions through a participative process. 6. Leadership and management have a role in policy formulation.
Scientific (Research-Based) Knowledge	The knowledge on policy problems based on systemic analyses of data, trends, and causal relations between a diversity of phenomena	1. There are data, information, and studies on the policy problems to be settled. 2. Scientific studies have a role in establishing a consensus among a variety of group interests. 3. There are involvements of experts and NGOs capacitated with transport system planning. 4. There is an alignment between the policy produced and the scientific basis established. 5. There is testing and reporting of the policy trial and evaluation of the policy trial.
Practical Implementation Knowledge	The knowledge which represents organizational ability to implement a policy	1. There are involvements of private and NGO systems in not only the traffic restriction policy but also other policies. 2. Policy implementation is prepared technically. 3. There are clear coordination paths and collaborative schemes based on bureaucratic rules among policy implementation stakeholders. 4. There is technological mastery and use in the traffic restriction policy through implementing the odd-even system.

Source: Head (2008), processed by the researchers, 2020.

Transportation Concept

According to Nasution (1996), transportation is the displacement of goods or humans from a location of origin to a location of the destination. Another definition offered by Soesilo (1999) says that transportation is human movement behavior within a space carrying both him-/herself and goods. The two definitions of transportation above converge at some points. Both contain elements of displacement or movement, load, and two points, showing the function of transportation in human life. The movement of humans and goods, which underlies transportation, is performed to achieve a basic objective or task that requires displacement from one location to another (Garber & Hoel, 2009).

Methods

This research employed a post-positivist approach. In the scientific method—the accepted approach to research by post-positivists—a researcher begins with a theory, collects data that either supports or refutes the theory, and then makes necessary revisions and conducts additional tests (Cresswell & Creswell, 2018). Using this approach, the researchers conducted this research based on the evidence-based policy theory established by Head (2008) without restricting the findings in the field to the theory used. This research used the qualitative method in data collection through in-depth interviews and literature study techniques. The interview was done semi-structured while the informants were selected through purposive sampling. The interview was held from March to June 2021. It varied in the length of the interview from 45 minutes to 2 hours long, depending on each informant's substance. The interview generated data that is inclusively multi-perspective varied from multi-actor in the policy formulation. The multi-perspective data was used in the triangulation process to make a comprehensive analysis through the qualitative data analysis method. Table 3 below shows the informants and the criteria they had to be chosen as informants in this research.

Table 3.
In-Depth Interview Sources

No.	Institution/Role	Informant's Name	Consideration
1.	Dinas Perhubungan Pemerintah Provinsi DKI Jakarta	Praditya Septa Hise (Traffic Management Section Staff)	A leading agency in odd-even traffic policy. So, it can provide information about the policy process.
2.	Traffic Directorate of Polda Metro Jaya	(First Police Inspector) Titin (Administration Officer of Regulation Section of Guidance and Law Enforcement Sub-Directorate)	An element of supervision and law enforcement on traffic restrictions policy. Information regarding policy readiness and implementation is the domain of Polda Metro Jaya.
3.	Transportation Study Institute (INSTRAN)	Darmaningtyas (Head of INSTRAN)	NGO that plays an active role in providing advocacy and recommendations for transportation policies. Researchers need information related to applying good transportation principles in even-odd traffic restriction policy.
4.	Online Driver Association (ADO)	Wiwit Sudarsono (Head of ADO)	Interest groups are directly affected by the policy. Researchers need information on consensus building and political commitment to the policy.
5.	Transportation Expert and Practitioner.	Prof. Dr. Ir. Sutanto Soehodho M. Eng.	He is a former Deputy of the Governor of DKI Jakarta for Industry, Trade, and Transportation Affairs at the time of the formulation of Governor Regulation Number 88 of 2019. He is also a Professor in transportation study at the University of Indonesia. Researchers need odd-even policy formulation data and information based on his competence as a transportation expert and practitioner.

Source: Data Processed by the Authors

In qualitative data analysis, researchers need to conceptualize raw data by understanding and organizing data based on themes, concepts, or other similarities. This is done through a coding process, where, unlike quantitative data processing which coding only plays a role in data management, qualitative data coding is an integral process in data analysis. Codes are tags or labels to assign units of meaning to descriptive or inferential information collected during research. Codes are usually attached to "chunks" of varying sizes - words, phrases, sentences, or entire paragraphs, linked or not linked to specific settings. (Miles and Huberman, 1994 in Neuman, 2014). In this research, data analysis was performed with an illustrative strategy to depict the odd-even policy formulation in DKI Jakarta Province from the evidence-based policy perspective. This method was chosen by considering the use of evidence-based policy theory used as an empty box filled with empirical data and information on field findings. The data and information in the box are to confirm or reject the theory, which can be in the form of a general model, analogy, or a sequence of steps (Neuman, 2014).

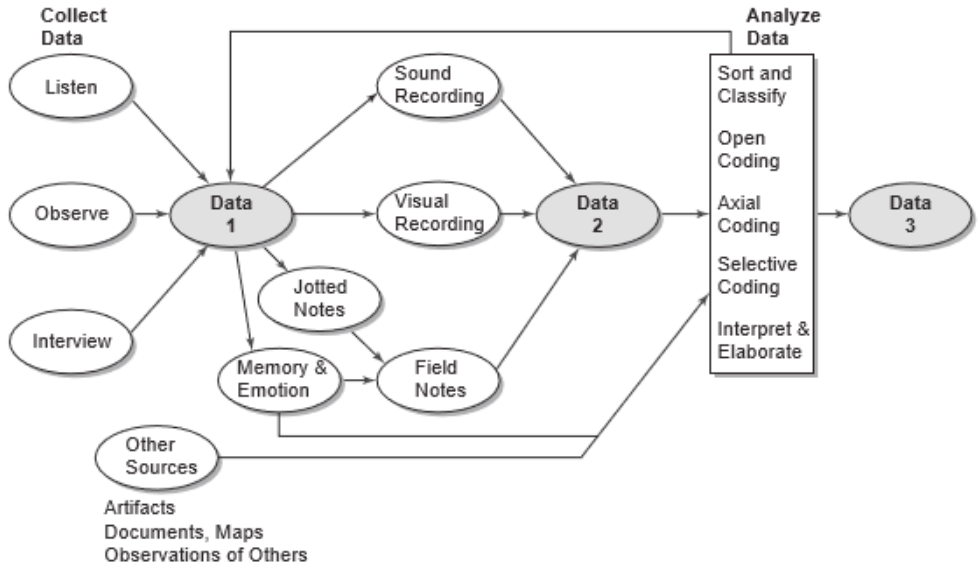
Results and Discussion

Political Knowledge in the Odd-Even Policy Formulation

The discussion on the odd-even policy expansion begins with the DKI Jakarta Governor Instruction No. 66 of 2019 on Air Quality Control. This policy indicates that the government's priority in the odd-even policy is directed to air quality control. Yet, the fact that an objective and a priority value are in place in a policy does not necessarily guarantee that the policy will win political support from all groups in society. This is because a policy stands in a complex environment with a tangle of interests of a diversity of groups. Such a dynamic sets a natural environment for a policy, and a policy formulation process should ideally be able to accommodate it into a constructive process. Despite the incomplete support from the administration internal, Governor Anies Baswedan proceeded with this policy formulation, regardless of the 2018 Asian Games momentum, into a more technical phase.

Systemic participative processes in practice are undertaken through two activities, namely coordination meetings and focus group

Figure 1.
Qualitative Data Analysis



Source: Neuman (2018)

discussions. The former is where policies in the governmental environment, be it the DKI Jakarta Provincial Administration, the Jakarta City Transportation Board, or the Jakarta Metro Police, are discussed. Meanwhile, the latter is used for discussing policies with non-governmental actors, consisting only of NGOs and academics. The coordination meetings with governmental organs—technical offices of the DKI Jakarta Province and the Jakarta Metro Police—face no difficulties in forming a consensus in the odd-even policy implementation. But sectorial interests persist, especially concerning material support in policy implementation by the Jakarta Metro Police. It is these interests accommodated by the DKI Jakarta Provincial Administration through a grant mechanism. The grant per se takes the form of Rp38.5 billion worth 45 E-TLE (Electronic Traffic Law Enforcement) cameras deployment to the odd-even expansion coverage areas in the budget year 2020. Meanwhile, in FGDs, the DKI Jakarta Provincial Administration adopts an open attitude toward opinions from involved groups.

With business interest groups, participative processes are undertaken through separate meetings, depending on the reactive participation of interest groups. The forms of economic interest groups' participation in the odd-even policy formulation show that how political knowledge is built is not restricted to systemic participatory processes with government initiation. The reactive participation of interest groups affected by the policy contributes to political knowledge building. One group affected by the policy is that of online taxi drivers. The Online Drivers Association (ADO) then endeavors to advocate its interests to be able to conduct its economic activities as an online transport partner. Four-wheel modes of transportation employed in online ride-hailing services, according to the Governor Regulation No. 88 of 2019, are not exempted from the odd-even policy.

According to the DKI Jakarta Transportation Department, although they have been assigned by the Minister of Transportation into the public motor vehicle category, online taxis use black-colored license plates, making it difficult for the police to conduct supervision and law enforcement upon them. This complexity has its roots in the absence of online-taxi-related policy that requires a distinct way of online taxi marking as a public motor mode of transportation. It becomes difficult to resolve conflicts of interest as both parties have different ways of seeing problems.

Legally speaking, the Regulation of the Minister of Transportation No. 118 of 2018 on the Implementation of Special Rental Modes of Transportation rules online taxis (special rental modes of transportation) as public motor vehicles, as are conventional taxis according to the Regulation of the Minister of Transportation No. 32 of 2016. Meanwhile, the odd-even policy has its basis in the Government Regulation No. 32 of 2011 on the Management and Engineering, Impact Analysis, and Management of Traffic Needs concerning Traffic Restriction upon Private Vehicles. Therefore, it becomes legally inappropriate to apply the odd-even policy to public motor vehicles, in this case, special rental modes of transportation or online taxis. No legal certainty can be conferred upon online drivers, resulting in difficulty resolving conflicts of interest and an incomplete political consensus. Political commitments with online taxi drivers are established not from an awareness of collective interests, but law enforcement and sanctions through government instruments.

The problem with online taxis in the odd-even policy is not only limited to obstacles in the technical aspects of oversight over special rental modes of transportation. In a more fundamental context, applying the odd-even policy to online taxis marks a failure in providing legal certainties. The absence of legal certainties concerning the problem with special rental modes of transportation renders the consensus established with the online taxi drivers group less

than ideal, in which case political commitments to the policy are determined only by government authority through the police, which is assigned with law enforcement. Aside from that, no fair treatment is received by the online taxi drivers group. Communication and compromise of interests may produce an ideal policy if done upon a legal certainty so any political process results arising from the policy formulation will give every party due fair treatment. The effectiveness of data- and information-based policies must be in parallel with the fairness and legal certainties between interest groups.

The DKI Jakarta Transportation Department opines that the primary strategy and tactic of establishing a consensus among stakeholders are to have sound communication. Although not all interests can be accommodated, the DKI Jakarta Provincial Administration through the DKI Jakarta Transportation Department is expected to explain what objectives and priority values are to be achieved through the odd-even policy. This communication strategy helps build an understanding of the policy priorities and the grounds for the policymaking among the policy implementers and community groups.

Bureaucratic openness and the role of leadership in explaining a policy to the public are driven through the role of the mass media. The mass media has a role in highlighting a policy

Table 3.
Political Knowledge Dimension Appropriateness Matrix

Dimensions	Indicators	Description
Political Knowledge	There are priorities and ideological values that influence policies.	The environment becomes the priority value in the odd-even policy, as exhibited through air quality control.
	There are a participative system and a participative process in the policy process.	There are participatory and systemic processes through coordination meetings and focus group discussions (FGDs).
		FGDs are restricted only to NGOs and academics.
		The researcher found openness in the DKI Jakarta Provincial Administration through the Transportation Department in FGDs.
		Rather than by systemic participatory processes, community participation, especially that of business groups, is dominated by reactive participatory processes by business interest groups.
		The mass media has a significant role in supporting reactive participation by economic interest groups through information distribution to the community.
	There arise debates and conflicts of interest along with their resolutions through a participative process.	Debates and conflicts of interest do not arise in FGDs, but through the reactive participation of community groups.
		The DKI Jakarta Transportation Department shows openness to make compromises and explanations regarding the odd-even policy formulation process.
		The establishment of a consensus is difficult to do and is less than ideal due to the absence of legal certainties among online taxi drivers.
	Strategies and tactics are in place in the policy process undertaken by the DKI Jakarta provincial administration.	Open communication of policymaking basis serves as a strategy in policy formulation.
	Leadership and management have a role in policy formulation.	Leadership and management are open to the problems faced by interest groups.
		The management maximizes the role of the mass media as a channel for disseminating an understanding to the community regarding the basis for the decision-making with appropriate targets and concepts.
		Political leaders are held responsible for possible unpopular or seemingly ineffective policies in the community.
	There is a political commitment to the policy from every interest group.	Political commitments of online taxi drivers are formed due to law enforcement processes not grounded on the awareness that policies are for collective interests.

Source: Data Processed by the Authors

problem and in fighting for values in which the community is interested. Most interest groups involved in a policy formulation process are the product of the role of the mass media. The Transportation Department in practice only maps the Regional Government, the Regional Police, and pressure groups of NGOs and academics into the odd-even policy formulation process through focus group discussions. Meanwhile, participation of economic interest groups is born from an independent awareness to open up a room for discussion with the Transportation Department. The room for discussion between interest groups and the DKI Jakarta Transportation Department will be opened only up if the mass media can provide accurate information and to reach the interest groups; it is, in this case, the mass media may serve its role. Through reactive participation of the community, supported by the mass media, a room for dialog can be opened up to form political knowledge in the odd-even policy formulation.

Scientific (Research-Based) Knowledge in the Odd-Even Policy Formulation

Pros and cons related to the odd-even policy have been arising from the very beginning. The odd-even policy cannot solve any of the transportation problems and only shifts congestion from the corridors covered by the policy to alternative others. The policy more appropriate for this context should be congestion pricing with the charging of a marginal cost from private vehicles upon the users, the proceeds from which can later be allocated for the improvement of the quality and capacity of public transportation services.

The research by Li & Guo (2016) shows that the traffic restriction policy through the odd-even system in the 2018 Beijing Olympics might serve as an effective short-term managerial step in dealing with the increase in transport demand and congestion during major events such as the Olympics. However, the demand for travel by private vehicles did not decrease at the same proportion as the total number of banned vehicles, at least with toll roads and main arterial roads in the city. This research aligns with that of Yudhistira et al. (2019), which found that the intervention with the odd-even policy did shorten the travel time on the corridors covered by the policy, but it failed to influence the travel demand. The effectiveness of the odd-even policy could not endure in the long run.

According to the DKI Jakarta Transportation Department, the reason the DKI Jakarta Provincial Administration still relies on the odd-even policy and has yet to shift to congestion pricing is that the congestion pricing concept known to the public as electronic road pricing (ERP) is complex, both in technological and managerial terms. However, the traffic restriction policy formulation with the odd-even system does consider the implementation of congestion pricing or electronic road pricing (ERP) in Jakarta. Besides, this policy is designed only as a transitional policy toward congestion pricing implementation. Considering that it is only a transitional policy, the formulation of the odd-even policy is continued. Into a more technical phase, the odd-even policy formulation process by the DKI Jakarta Transportation Department has gone through data and information collection as a policymaking foundation. The data and information cover the basis and technical consideration for implementing the odd-even policy. Moreover, the outcome from the policy formulation process is judged based on the policymaking data and information basis. The DKI Jakarta Transportation Department in formulating the odd-even policy involves experts and non-governmental organizations (NGOs) to gain broader perspectives relevant to scientific needs.

With air quality control being prioritized, air pollution serves as the basis for the odd-even policy implementation. The DKI Jakarta Provincial Administration believes that the $PM_{2.5}$ and PM_{10} air pollution in the city mostly comes from motor vehicles, which contribute to public health

problems. Based on the 2019 World Air Quality Report: Region & City $PM_{2.5}$ Ranking Report by IQAir (2019), Jakarta is the city with the fifth-highest average $PM_{2.5}$ concentration in the world with 49.4 μg/m^3. Pramitha & Haryanto (2019) found that in Pulo Gadung the $PM_{2.5}$ became the greatest contributor to public cardiovascular disorders with an average $PM_{2.5}$ concentration of 308 μg/m^3, with 38.5% suffering disorders in the heart. Greenstone & Fan (2019) state that the Jakarta people are predicted to lose 2.3 years of their life expectancy if the air pollution condition in 2016 persists throughout their lives. Yet, despite the magnificent air pollution effects, the DKI Jakarta provincial administration has yet to show sufficient seriousness in performing air pollution evaluations. The Indonesian Center for Environmental Law (ICEL) highlights the non-existence of emissions inventories the DKI Jakarta Environment Department is supposed to undertake (Erou & Fadhilah, 2019). An emissions inventory is a recording process of air pollution sources, both mobile and immobile, with a resultant emissions contribution load and a total load that affects the air quality.

The ability of the DKI Jakarta Provincial Administration in monitoring air pollution can be an evaluation tool and a data source in the policy formulation related to air quality development. However, the DKI Jakarta Provincial Administration's not independently conducting any emissions inventories through the Environment Department may hinder the efforts of air quality control as of concern to the DKI Jakarta Governor expressed in the DKI Jakarta Governor Instruction No. 66 of 2019. With no emissions inventories, the DKI Jakarta Provincial Administration cannot collect data of sources and contributions to air pollution loads accurately. Emissions inventory practices have until today been conducted only by the academic community, and with no systematic integration with policymaking processes in that. As a consequence, the emissions inventory data generated are inaccurate and unworkable dynamically as part of the evaluation process according to the development and impacts of the policy.

Despite the above, the assessment of the DKI Jakarta Provincial Administration agrees with the thesis results of Arrohman (2019), who, using the GAINS method, compared the effectiveness of some transportation policies in reducing air pollutions, including the EURO IV implementation in 2018, the CNG implementation in 2020, the scraping implementation in 2025, and the odd-even system implementation in 2018. The results show that the odd-even policy was predicted to have the best rates of air pollution decrease with the rates in its first year of implementation of 2020 reaching 51.1% or 59.15 kton for NO_x, 43.26% or 0.8 kton for SO_2, 57.42%, or 398.53 kton for CO, 52.3% or 4.45 kton for PM_{10}, 54.05% or 3.8 kton for $PM_{2.5}$, and 54.06% or 1.47 kton for BC.

The high number of motor vehicles in Jakarta, other than causing air pollutions, also directly leads to traffic density and congestion. Given the immense economic effect generated by fuel and time inefficiencies, congestion becomes the next consideration for the DKI Jakarta Provincial Administration. As stated by Praditya, the ratio of road volume to road capacity in Jakarta, especially along the corridors covered in the odd-even policy, had reached 0.8 to 0.9. Meanwhile, the average speed on the corridors covered by the odd-even policy before the formulation process was less than 30 km/hour.

The problem is that an increase in road capacity is no longer effective nor efficient given the high costs that must be incurred. Furthermore, the prioritization of the environment can no longer be accommodated through a road capacity increase policy. Therefore, the option left to the DKI Jakarta Transportation Department is to regulate the travel behavior of the community. Here, the DKI Jakarta Transportation Department uses the push and pull strategy with restriction to private vehicles and Transjakarta trajectories availability

serving as the main criteria in determining which corridors are to be covered in the odd-even policy. Of the existing 247 Transjakarta trajectories, 192 along 12 corridors can accommodate the demand of the community along the 25 corridors covered in the odd-even policy.

The formulation of the traffic restriction policy through the odd-even system also considers field data and information gathered through the evaluation process of previous odd-even policy simulation and scheme implementations, including the implementations of the odd-even policy during the 2018 Asian Games (Governor Regulation No. 77/2018), during the 2018 Asian Para Games (Governor Regulation No. 92/2018), and after the 2018 Asian Para Games (Governor Regulation No. 106/2018). The results show the average values of the indicators speed, travel time, and public awareness of taking public transportation modes (Transjakarta buses) increased.

The evaluation above yielded information that is viable and in support of the odd-even traffic restriction expansion policymaking. The results indicate the odd-even policy's effectiveness along the corridors covered. However, the evaluation above has a limitation in explaining the traffic conditions in Jakarta. The measurement of average vehicle speed was only conducted on the trajectories covered by the odd-even policy, hence being weak in explaining the effect of the odd-even policy on the traffic conditions in Jakarta or the effect of the traffic restriction along certain corridors on the other corridors.

Based on the results of the policy trial evaluation, motorcycles contributed the greatest along the corridors covered by the odd-even policy. 79.13% of the motor vehicles passing the corridors covered by the odd-even policy during the trial were motorcycles. This is normal, given that motorcycles made up the greatest proportion of vehicles in Jakarta. With such a huge figure, motorcycles became the largest CO pollutant contributor in the transportation sector, in which case this sector contributed 93% of the CO pollutant in Jakarta (Lestari et al., 2020). Despite the above-mentioned, motorcycles are exempted from the odd-even policy. The rationale behind this non-enforcement of the policy on motorcycles lies in the economic aspect. Use restriction of motorcycles which generally are ridden by people of lower-middle-class can raise the cost of transportation by public modes of transportation. Besides, the odd-even policy is deemed non-implementable.

Data and information were not overly significant in forming a consensus among online taxi drivers, given that, if seen in the legal context, the odd-even policy implementation on special rental vehicles for public transportation (online taxis) does not comply with the Governor Regulation No. 32 of 2011. Online taxi operations as special rental vehicles for public transportation should be managed under an appropriate policy like the Regulation of the Minister of Transportation No. 118 of 2018. The air quality control and transport problems alleviation in Jakarta in the context of online taxis will be higher in effectiveness and fairness if conducted with arrangement and oversight of the need for special rental motor vehicles for public transportation. Regulating the Minister of Transportation No. 118 of 2018 requires that all drivers must arrange for a Special Rental Vehicle (ASK) license and must have an Electronic Service Standard Card (KESP) for every vehicle used. The size of special rental vehicles demand allowed in Jabodetabek per se was set at 36,510 vehicles, in which case, as of June 2019, according to the Head of the Jabodetabek Transportation Management Agency (BPTJ), the number of licensed vehicles reached as low as 6,000 (Anwar, 2019). Meanwhile, as revealed by the Minister of Communications and Information's data, there were 175,000 vehicles in one applicator in 2018 alone (Rachman, 2019). The oversight and licensing of the size of special rental vehicles demand allowed led to the problem of a high number of online taxis contributing to air pollution.

Table 4.
Scientific (Research-Based) Knowledge Dimension Appropriateness Matrix

Dimensions	Indicators	Description
Scientific (Research-Based) Knowledge	There are data, information, and studies on the policy problems to be settled.	The researchers found usage of data, information, and analyses in technical, economic, and environmental terms by the DKI Jakarta Transportation Department.
		There are limitations in data and information as policy formulation bases which ideally are supposed to be comprehensive in data scope, data types, and data collection methods.
		The traffic restriction is linear with the air quality control priority.
		The Transjakarta service availability serves as a criterion that must be fulfilled in the DKI Jakarta Provincial Administration's push and pull strategy through the odd-even policy.
		The odd-even policy cannot scientifically prove effective in the long term so the DKI Jakarta Provincial Administration uses it only as a transitional policy.
	There are testing and reporting of policy trial and evaluation of the policy trial.	The odd-even policy scheme and trial has been analyzed three times—during the 2018 Asian Games, during the 2018 Asian Para Games, and after the 2018 Asian Para Games—and the simulation is under Governor Regulation No. 88/2019.
		The trial report shows the odd-even policy's effectiveness in increasing the average speed and using Transjakarta service and in decreasing the vehicle volume and travel time.
		The trial report is limited in that it cannot illustrate the effect of the odd-even policy on the traffic conditions in Jakarta in a holistic, network-based manner.
	There are involvements of experts and NGOs capacitated with transport system planning.	There are involvements of experts and NGOs in the odd-even policy formulation.
		The researchers found that the DKI Jakarta's Transportation Department is open to the opinions of the NGOs and experts involved through FGDs.
	Scientific studies have a role in establishing a consensus among a variety of group interests.	Scientific research did not significantly influence the consensus establishment process due to a lack of legal certainties and a limitation in data and information.
		The arrangement of online taxis through the odd-even policy is inappropriate. The primary problem lies in the oversight over and licensing of the allocation for special rental modes of transportation demand.
	There is an alignment between the policy produced and the scientific basis established.	In general, the odd-even policy has been in accordance with the data and information analysis conducted, both substantively and technically. The problem lies in incomprehensiveness in the data and information.

Source: Data Processed by the Authors.

Practical Implementation Knowledge in the Odd-Even Policy Formulation

The DKI Jakarta Transportation Department has gone through a lengthy process for the technical preparation of the policy implementation. This policy formulation process involves several activities to prepare the policy implementation. In technical terms, each party has had a full understanding of their authority and responsibility and has shown preparedness and ability to tackle challenges that arise in the field during the trial period. This is thanks to the systematic coordination process undertaken to internalize the policy objective of each policy implementer. The collaborative process in the odd-even policy formulation not only influences the policy foundation and objective but also improves the policy implementation preparedness. In the government sector, three technical agencies of the DKI Jakarta Provincial Administration and the Jakarta Metro Police are involved. The three technical agencies involved in the odd-even policy implementation are the DKI Jakarta Transportation Department, the DKI Jakarta Communications, Information, and Statistics Department, and the DKI Jakarta Environment Department.

The drawback of the technical preparation for the odd-even policy implementation is that the discussions in the policy formulation process

have only been conducted around oversight over the legal violations which directly are regulated under the traffic restriction policy. They do not discuss other violations which indirectly may influence the effectiveness of the odd-even policy. An instance of a violation is a falsification of a motor vehicle license plate to match the date of use, which can be proven by data. Therefore, it is necessary to improve the performance of inspections over motor vehicles in a conventional, periodic way with the expansion of the odd-even policy coverage area. It is also necessary to use general violation data indirectly associated with the effectiveness of the policy during the odd-even policy evaluation process.

In the odd-even policy formulation, technological use in the policy implementation has been planned. Practically speaking, periodic evaluations of the odd-even policy implementation are conducted with Waze and Google Maps to measure the vehicle speed and travel time. This technological use helps determine the sustainability of the policy. This way the provincial administration can better improve the efficiency in data collection than when conventional methods are used. In addition, a higher level of accuracy can be obtained with dynamic data collection time according to the policy evaluation need. The oversight and law enforcement over violations of the odd-even policy are assisted by the E-TLE (Electronic-Traffic Law Enforcement) system. The DKI Jakarta Provincial Administration's support is shown through grant of cameras in the budget year 2020 to 45 points along the corridors covered by the odd-even policy to meet the E-TLE use target across the odd-even policy coverage corridors.

From the perspective of policy as a system, a policy needs back-up from other policies to

Table 5.
Practical Implementation Knowledge Dimension Appropriateness Matrix

Dimensions	Indicators	Description
Practical Implementation Knowledge	There are involvements of private and NGO systems in not only the traffic restriction policy but also other policies.	The mass media serves as a non-government actor involved in the policy implementation. The mass media has a role in building public understanding of and preparedness for the policy implementation.
		The odd-even policy is supported by other policies through the E-TLE cameras grant and the park and ride development grant in Jakarta buffering areas.
	There are clear coordination paths and collaborative schemes based on bureaucratic rules among policy implementation stakeholders.	There are coordination paths and collaborative schemes discussed in the policy formulation process according to the main tasks and functions of each institution. There are no obstacles in the establishment of the coordination paths and collaborative schemes in the policy formulation process.
	Policy implementation is prepared technically.	Analyses show preparedness for the policy implementation on the parts of both the DKI Jakarta Provincial Administration and the Jakarta Metro Police. An understanding of the responsibilities and tasks of each according to the coordination paths and collaborative schemes has been established throughout the collaborative policy formulation process.
	There are technological mastery and use in the traffic restriction policy through implementing the odd-even system.	Measurement of speed and travel time is conducted by the Transportation Department through Google Maps and Waze data analysis as a form of technological utilization.
		The E-TLE system has effectively reduced the need for human resources in the oversight over the odd-even policy implementation. The odd-even policy expansion through the Governor Regulation No. 88/2019 needs no additional personnel, thanks to the E-TLE system support.
		The odd-even policy formulation has incorporated the E-TLE system development plan to be an effective law enforcement instrument along all the corridors covered by the odd-even policy in 2020. To achieve this target, an E-TLE cameras grant is provided.

Source: Data Processed by the Authors.

solve a public issue. Thus, to overcome the air quality control and transportation problems the DKI Jakarta Provincial Administration has prepared the park and ride development grant program for the buffer cities surrounding Jakarta. This is intended to restrict the number of travels by private vehicles from these buffer cities. The concept underlying this program is that by providing a parking facility for community members with private vehicles in the buffer areas at some public transportation points, it is expected those who are to go on travel into Jakarta are encouraged to do so by public transportation. This grant program is still in discussion. This park and ride development program in Jakarta buffer areas is expected to cater to the needs of community members restricted in their travels to Jakarta by the odd-even policy. This is because most travelers in Jakarta are from these buffer cities.

Strengthening The Understanding of Policy Issues

In discussing the problem of congestion in Jakarta, the previous scientific literature focused more on limited scientific fields and did not provide an overview in a more multi-disciplinary perspective which resulted in policy problems not being fully understood. Such as research by Yudhistira et al. (2019) which focuses on the perception of the people of Jakarta on traffic congestion and Arrohman (2019) which focuses on the relationship between transportation policies in Jakarta and air pollution levels. Meanwhile, research with an evidence-based policy approach has never been used in understanding odd-even policy as an effort to solve congestion problems in Jakarta. This study contains a more comprehensive perspective within the framework of the three principles of evidence-based policy, which Head (2008) stated policy-making has the potential to reduce the role of technocrats and is more open to a network approach. Here, with so much interest in economic and environmental dimensions, social and political aspect was not particularly covered by the previous research. This research extends the discussion on Jakarta's traffic problem and odd even policy to a broader field. The result is to find there is legal certainty that has failed to be given to online transportation groups that should be treated as public transportation. Legal certainty and its influence in the formation of political consensus on the odd-even policy which has not received sufficient attention in previous research regarding congestion in Jakarta and odd-even policy need to be highlighted from this article. While this policy is scientifically proven to be ineffective in the long term, the injustices felt by online transportation groups must be addressed urgently by the government.

Conclusion

The traffic restriction policy formulation with the odd-even system (the Governor Regulation No. 88 of 2019) has complied with the evidence-based policy principle. The participatory process in the establishment of a consensus regarding and political commitments to the policy has to be in line with the principle of political knowledge based on the environmental priority value. Scientific (research-based) knowledge has been built through data and information in the policy formulation by the DKI Jakarta Transportation Department through studies in the technical, economic, and environmental aspects and the involvement of academics and NGOs. Last, practical implementation knowledge has been successfully established through a participatory policy formulation process between involved governmental institutions, both the regional government and the regional police.

However, a couple of points have been noteworthy in the odd-even policy formulation. First, the absence of legal certainties enjoyed by online taxi drivers causes the consensus to be imperfectly established. Second, there has been a substantive limitation in data and information in the odd-even policy formulation. For instance, no

emissions inventories have been conducted, and data usage is limited only to the corridors covered by the odd-even policy, preventing evaluation of the odd-even policy's contributions to the traffic and air pollution problems in Jakarta in general. The violation data used were restricted only to those violations directly associated with the odd-even policy. In theoretical terms, this research has contributed two newly discovered determinant factors that influence political knowledge significantly, namely, first, assurance of fairness based on legal certainties and, second, the role of the mass media in disseminating information to the public.

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