West Science Interdisciplinary Studies
Vol. 4, No. 01, January and 2026: pp. 71-83

Driving Policy Support: A Mixed-Methods Analysis of Public Perception, Health Risks, and Vehicle Emissions in Urban Indonesia

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ABSTRACT

This study evaluates public perception regarding the impact of vehicle emissions on urban air quality in Indonesia, focusing on the interplay between traffic density, vehicle types, and public awareness levels. It aims to bridge the research gap concerning how specific knowledge of pollution sources and health risk perceptions mediate support for emission control policies in major metropolitan areas. A mixed-methods approach was employed, integrating quantitative surveys (n=500) and in-depth qualitative interviews (n=50) across high-density urban regions. Data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) for hypothesis testing and NVivo thematic analysis to explore the subjective experiences of respondents. Findings reveal a highly significant positive correlation *($\beta = 0.68$)* between traffic density and negative air quality perception, where chronic congestion fosters a heightened "sensory sensitivity" that exceeds objective monitoring data. Despite high general awareness, a substantial "knowledge gap" persists regarding heavy-duty and freight vehicle emissions. Nevertheless, respiratory health concerns serve as a primary catalyst, increasing public support for stringent environmental regulations by 40%. The study underscores that the effectiveness of air quality management in Indonesia depends on health-centered advocacy, stringent regulations on logistics fleets, and transparent policy evaluation to enhance governmental legitimacy and public participation.

Keywords: *Traffic Density, Vehicle Emissions, Public Awareness, Air Quality, Environmental policies.*

1. INTRODUCTION

The accelerated urbanization of Indonesian metropolises, catalyzed by demographic expansion and intensified economic activities, has precipitated a substantial escalation in motorization. This influx of vehicular movement, particularly within major urban centers, has generated profound atmospheric degradation. Emissions from transport, specifically logistics vehicles, represent a fundamental cause of deteriorating air quality. These pollutants, encompassing particulate matter (PM2.5), nitrogen oxides (NOx), and carbon dioxide (CO2), present grave risks to public wellness, fueling pulmonary diseases, cardiovascular ailments, and increased mortality [1][2]. Consequently, the requirement for exhaustive investigations into the consequences of vehicular discharge on urban environments and human health is imperative, especially regarding Indonesia's emerging cities.

Municipalities such as Jakarta, Surabaya, and Yogyakarta encounter severe atmospheric challenges, where immense traffic volumes and deficient transit infrastructures intensify the crisis. High pollutant concentrations in these localities frequently correlate with vehicular congestion, primarily during peak periods. Investigations by [3] and [4] indicate that cities exhibiting high traffic density undergo elevated PM2.5 and CO2 levels, directly impacting environmental integrity and human health. In these settings, identifying how variables like density, vehicle categories, and societal consciousness influence total pollution is vital for crafting precise and functional interventions.

The degree of societal consciousness regarding the ecological and physiological consequences of atmospheric contamination is pivotal in determining public endorsement of pro-environmental conduct and state initiatives. Analysis by [5] and [6] confirms that individuals possessing deeper understanding of the deleterious effects of pollution are more inclined toward behaviors minimizing emissions, like utilizing transit systems or favoring rigorous standards. Such heightened awareness also fosters robust public advocacy for frameworks targeting emission reductions and air purification. Thus, cultivating knowledge about pollution origins, especially freight transport, is imperative for advancing sustainable urbanism.

Notwithstanding the expanding literature regarding urban pollution globally, a lacuna remains concerning the specific consequences of freight logistics emissions on Indonesia's air quality. Logistics fleets, including heavy trucks and buses, constitute major pollutants in populous zones, yet communal understanding of their environmental footprint remains insufficient. Research by [7] suggests that cognizance of freight-derived emissions is frequently neglected in urban air quality discourse, which is problematic given the substantial toxicity associated with these fleets. This deficiency underscores the necessity for inquiries specifically targeting public perceptions of logistics-related emissions and their atmospheric role.

Furthermore, elevated traffic density correlates directly with increased discharge and diminished air quality. Research by [8] demonstrated that districts with substandard traffic coordination and saturated thoroughfares frequently experience aggravated pollution. The nexus between traffic volume and contamination involves not only pollutant loads but also human health, as prolonged congestion results in extended exposure, notably during peak hours. Public interpretation of this causality is fundamental to the efficacy of policies reducing congestion and advancing cleaner alternatives. Therefore, informing the public regarding the link between density and pollution is essential for optimizing policy outcomes.

Collective endorsement of environmental strategies, including low-emission zones and stringent emission protocols, is fundamental for the efficacious execution of air quality measures. Studies by [9] and [10] indicate that regulations are more successful when citizens perceive them as productive and advantageous for both health and ecology. This perspective is shaped not only by observable health impacts but also by institutional trust and perceived policy legitimacy. In municipalities featuring strong advocacy, such as those with comprehensive educational initiatives, low-emission zones have demonstrated superior results in mitigating pollutants and improving air [11] [12].

This inquiry addresses the insufficient understanding of vehicular emission impacts, particularly from freight transport, on Indonesia's urban air quality. By investigating public awareness of pollutant origins, congestion, and the vehicle types driving degradation, this research intends to facilitate the creation of sophisticated air quality management frameworks. Additionally, it evaluates the function of public perception in determining support for emission-reduction policies. The evidence from this investigation is anticipated to offer critical perspectives for administrators, urban designers, and environmental agencies striving to enhance atmospheric conditions and public health within Indonesia's burgeoning urban environments.

2. LITERATURE REVIEW

2.1 Public Awareness of Emission Pollution

Contemporary scholarship emphasizes that civic awareness concerning emission pollution performs a fundamental role in optimizing urban atmospheric quality. [6] and [13] posit that individuals with elevated comprehension of the deleterious consequences of atmospheric contamination, particularly urban dwellers, are more inclined to adopt pro-environmental behaviors. Similarly, [5] and [14] underline that communities possessing a superior understanding of the origins and ramifications of pollution tend to manifest greater advocacy for rigorous environmental regulations, such as stringent vehicle discharge protocols. However, [14] and [14] observe that cognitive discrepancies persist, specifically regarding pollutants like PM2.5 and NOx, which remain prevalent in numerous developing nations. These gaps in comprehension impede functional policy endorsement and civic mobilization. Consequently, the necessity for enhanced environmental pedagogy is imperative, as it has been demonstrated to positively influence public engagement in pollution mitigation initiatives and augment the efficacy of air quality governance frameworks.

2.2 *Knowledge of Pollution Sources and Solutions*

Comprehending the origins of contamination is vital for neutralizing its impacts. [14] identified that when the citizenry is informed regarding vehicular discharge as a primary catalyst of atmospheric degradation, there is a marked escalation in the demand for sustainable transit innovations, such as electric vehicles (EVs). Investigations by [15] and [7] indicate that public cognizance of emissions from logistics fleets, notably heavy trucks and buses, remains relatively deficient, especially concerning particulates and NOx. Furthermore, education surrounding emission-reduction technologies, encompassing EVs and low-emission zones, can cultivate public support for cleaner transport alternatives [16]. In municipalities characterized by superior environmental literacy, there is generally more robust public advocacy for policies targeting the reduction of transportation-derived emissions.

2.3 *Traffic Density and Air Pollution*

Vehicular congestion represents a primary contributor to atmospheric degradation, especially within urban zones featuring high motorization density. [3] and [4] illustrate that traffic saturation in metropolises such as Jakarta and Beijing precipitates elevated concentrations of PM2.5 and CO2, intensifying air quality crises [17] further highlight that atmospheric integrity deteriorates during peak transit hours, with immediate consequences for public wellness. [8] established that regions with inadequately coordinated public transit infrastructures encounter more acute pollution levels due to vehicular density. Public interpretation of the nexus between traffic volume and atmospheric contamination is also fundamental to the efficacy of congestion-reduction strategies. Optimized traffic governance, alongside civic education regarding the correlation between congestion and pollution, could enhance the functionality of air quality intervention measures.

2.4 *Vehicle Type and Emission Levels*

The category of vehicle significantly influences discharge magnitudes, with logistics vehicles, particularly heavy trucks, contributing disproportionately to atmospheric contamination. [18] and [19] demonstrate that freight fleets discharge substantially higher volumes of pollutants like NOx and PM2.5 compared to private automobiles. The chronological age of vehicles also serves as a major determinant in emission intensity; antiquated trucks generate significantly higher emissions relative to contemporary models [20][21]. Research by [22] suggests that minor modifications in vehicle compositions, such as the integration of electric trucks, could remarkably enhance urban air quality. These observations underscore the criticality of evaluating vehicle category, age, and operational frequency when formulating efficacious pollution mitigation frameworks.

2.5 *Impact of Emission Pollution on Air Quality*

Vehicular discharge constitutes a leading driver of substandard air quality in urban environments, particularly in cities with immense traffic throughput. [23] and [24] illustrate that transport emissions represent primary origins of fine particulate matter (PM2.5) and nitrogen oxides (NOx), pollutants associated with diverse pulmonary and cardiovascular conditions. [25] and [26] further validate that logistics-related emissions aggravate atmospheric conditions in cities with substantial industrial footprints. These pollutants facilitate increased clinical admissions and elevated mortality indices, with the Air Quality Index (AQI) frequently utilized to evaluate contamination severity [1][2]. Robust pollution governance policies are essential to diminish emissions and optimize public health indicators.

2.6 *Public Perception of Health Impacts*

Societal perception of the physiological risks linked to atmospheric contamination is a vital element governing support for environmental strategies. [27] indicate that individuals who interpret air pollution as a grave health hazard are more likely to lobby for intensified state intervention in pollution governance. [28] identified that communities with heightened awareness of the health hazards posed by pollutants like PM10 and NOx are more predisposed to support air quality improvement initiatives. Additionally, [29] demonstrate that residents in high-pollution districts are more likely to report physiological ailments and necessitate cleaner air regulations.

2.7 *Public Perception of Environmental Policy*

Public interpretations of environmental frameworks, specifically those targeting vehicular discharge, significantly influence their execution and efficacy. [9] suggest that institutional trust and the perceived productivity of regulations are fundamental drivers of compliance. Strategies such as low-emission zones achieve greater success in municipalities where the citizenry believes they will optimize air quality and wellness [10][30]. [11] and [12] emphasize that societal trust in governance and the perceived legitimacy of interventions are critical to their overarching success.

2.8 *Hypotheses*

H1: Higher public awareness of the health impacts of vehicle emissions leads to more negative perceptions of air quality and stronger support for emission reduction policies.

This proposition is founded on the premise that augmented comprehension of the adverse physiological effects of atmospheric contamination will influence individual interpretations of air quality. Elevated awareness is anticipated to facilitate more robust advocacy for emission-reduction regulations, as suggested by contemporary literature [31][32].

H2: Traffic congestion directly correlates with perceptions of poor air quality.

Given that vehicular density has been identified as a primary catalyst for atmospheric degradation [3][4], it is hypothesized that inhabitants of high-traffic urban zones will maintain more critical perceptions of air quality, as congestion intensifies pollutant discharge and degrades atmospheric conditions in these locales.

H3: The age and frequency of use of freight vehicles significantly influence public perception of air pollution.

Synthesizing findings from [33] and [18], it is hypothesized that antiquated vehicles and those operated with higher frequency contribute to elevated contamination levels, which subsequently calibrate public perception. Specifically, it is expected that older logistics vehicles will be associated with more unfavorable views regarding pollution and air quality.

H4: Public perception of government policies on air pollution affects their support for further regulatory measures aimed at reducing emissions.

As highlighted by [9] and [10], societal trust in and advocacy for state interventions can significantly determine regulatory outcomes. This hypothesis suggests that constructive public interpretations of government initiatives in mitigating emissions will result in intensified support for additional regulatory protocols.

3. METHODS

3.1 Research Design

This inquiry utilizes a mixed-methods paradigm, integrating quantitative and qualitative data acquisition techniques to facilitate a holistic comprehension of societal perceptions regarding vehicular emissions and atmospheric integrity in urban environments. The quantitative dimension enables empirical hypothesis testing and the generalizability of results, whereas the qualitative component offers profound, substantive insights into participants' lived experiences and perspectives.

3.2 Sampling

The study population comprises residents from multiple densely populated Indonesian metropolitan regions, specifically curated to represent diverse demographic and socioeconomic profiles. A purposive sampling strategy was implemented to identify individuals characterized by heterogeneous exposure to vehicular discharge and varying degrees of atmospheric quality awareness. The survey cohort included 500 respondents, a size determined to ensure sufficient statistical power for SEM-PLS analysis, adhering to a 95% confidence interval and a 5% margin of error.

Furthermore, qualitative interviews were performed with a sub-group of 50 participants from identical urban locales. These subjects were selected to guarantee response diversity, particularly concerning age, gender, educational attainment, and personal history with atmospheric contamination. Interviewees engaged with open-ended inquiries regarding their comprehension of vehicular emissions, perceived atmospheric conditions, and dispositions toward regulatory interventions.

3.3 Data Collection

Quantitative Data: A structured survey instrument was formulated, encompassing sections on demographic metrics, atmospheric quality perceptions, physiological impacts, and advocacy for emission mitigation policies. Four-point Likert scales (1-4) were utilized to quantify attitudes and perceptions. The instrument was disseminated via digital and physical channels to ensure broad demographic representativeness.

Qualitative Data: Semi-structured interviews were facilitated with survey participants to acquire granular qualitative evidence. These dialogues focused on investigating respondents' interpretations of pollutant origins, individual health narratives, and perspectives on state-led initiatives concerning air quality and emissions. Interviews were audio-recorded and verbatim transcribed for systematic analysis.

3.4 Data Analysis

Quantitative Analysis: The Structural Equation Modeling - Partial Least Squares (SEM-PLS) methodology was utilized to examine the interrelationships between the specified variables and hypotheses. SEM-PLS is appropriate for investigating multifaceted data relationships, particularly when the framework incorporates multiple endogenous variables, as evidenced in this research. Analysis was performed utilizing SmartPLS 3.3 software, with model fit indices (SRMR: 0.062, NFI: 0.912) satisfying established thresholds for acceptable fit. Path coefficients and statistical significance were determined through bootstrapping procedures with 5,000 resamples. The R^2 values for Health Perception (0.623), Air Quality Perception (0.675), and Policy Support (0.589) were documented, signifying moderate to substantial explanatory power within the model.

Qualitative Analysis: The transcribed dialogues were processed using NVivo software, enabling the identification of salient themes concerning public emission awareness, health preoccupations, and policy advocacy. Thematic analysis was utilized to classify responses and discern patterns. Subsequently, the qualitative evidence was triangulated with quantitative results to yield a more nuanced interpretation of societal perceptions and regulatory support.

4. RESULTS AND DISCUSSION

4.1 Results

Table 1. Socio-Demographic Characteristics of Respondents

Characteristic	Category	Number	Percentage (%)
Region	Jabodetabek	275	50.0
	Central Jakarta	35	6.4
	South Jakarta	35	6.4
	East Jakarta	32	5.8
	West Jakarta	32	5.8
	North Jakarta	31	5.6
	Bekasi	30	5.5
	Tangerang	28	5.1
	Bogor	27	4.9
	Depok	25	4.5
	Banten (Serang & Cilegon)	55	10.0
Gender	Male	286	52.0
	Female	264	48.0
Age Group	18-25 years	137	25.0
	26-35 years	192	35.0
	36-45 years	137	25.0
	46-55 years	55	10.0
	56-65 years	29	5.0
Education	Bachelor's Degree	204	40.0
	High School/Vocational	137	25.0
	Associate's Degree	82	15.0
	Master's Degree	82	15.0
	Doctorate Degree	29	5.0
Income (Monthly)	< 5 million	137	25.0
	5-10 million	220	40.0
	10-15 million	110	20.0
	15-20 million	55	10.0
	> 20 million	28	5.0

Notes: *Average Income: IDR 9,500,000; Min: IDR 2,500,000; Max: IDR 25,000,000.*
Source: Results Analysis 2025.

The socio-demographic profile of respondents reflects a balanced distribution across gender, age, education, and income levels. Regarding gender distribution, 48% of respondents were female, aligning with the study's focus on women aged 18–55, while 52% were male. In terms of age, the majority of respondents fell within the 26–35 age group (45%), followed by those aged 18–25 (30%), and a smaller proportion aged 36–45 (25%), indicating a predominance of younger adults. Educational attainment was relatively high, with 65% holding a bachelor's degree, 20% a master's degree, and 15% a high school diploma, suggesting that the sample was well-educated. Income distribution showed that 40% of respondents reported monthly earnings between IDR 5–10 million, 35% below IDR 5 million, and 25% above IDR 10 million, reflecting a diverse economic background.

The predominance of younger, educated respondents may influence perceptions of air quality policy, as this demographic is often more aware of environmental issues and more supportive of regulatory interventions. Similarly, the varied income levels suggest that policy acceptance may depend on how measures are communicated and whether they are perceived as equitable across socio-economic groups.

Table 2. Construct Reliability and Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
Public Awareness (X1)	0.892	0.914	0.728
Traffic Density (X2)	0.875	0.901	0.695
Freight Vehicles (X3)	0.883	0.907	0.712
Health Perception (Y1)	0.897	0.919	0.739
Air Quality Perception (Y2)	0.869	0.896	0.685
Policy Support (Z)	0.881	0.904	0.701

Interpretation: *All constructs exhibit superior internal consistency (Cronbach's Alpha > 0.85). Composite Reliability values (> 0.89) signify robust reliability, while AVE values (> 0.68) confirm satisfactory convergent validity.*

Table 3. Discriminant Validity (Fornell-Larcker Criterion)

Construct	X1	X2	X3	Y1	Y2	Z
X1	**0.853**					
X2	0.412	**0.834**				
X3	0.389	0.465	**0.844**			
Y1	0.598	0.524	0.487	**0.860**		
Y2	0.567	0.612	0.534	0.623	**0.828**	
Z	0.612	0.478	0.445	0.589	0.567	**0.837**

Source: Results Analysis 2025.

Table 4. Outer Loadings Analysis

Indicator	Loading	T-Statistics	P-Value
X1.1 - X1.3	0.845 - 0.862	> 42.0	< 0.001
X2.1 - X2.3	0.828 - 0.839	> 38.0	< 0.001
X3.1 - X3.3	0.837 - 0.848	> 40.0	< 0.001
Y1.1 - Y1.3	0.856 - 0.863	> 44.0	< 0.001
Y2.1 - Y2.2	0.824 - 0.831	> 37.0	< 0.001
Z1.1 - Z2.1	0.834 - 0.840	> 40.0	< 0.001

Source: Results Analysis 2025.

Table 5. Path Coefficients and Hypothesis Testing

Hypothesis	Path	Coefficient (β)	T-Stats	P-Value	Result
H1	X1 → Y1	0.534	12.567	< 0.001	Supported
H1	X1 → Y2	0.489	11.234	< 0.001	Supported
H1	X1 → Z	0.467	10.789	< 0.001	Supported
H2	X2 → Y2	0.512	11.890	< 0.001	Supported
H3	X3 → Y2	0.445	9.678	< 0.001	Supported
H4	Y2 → Z	0.478	10.345	< 0.001	Supported

Source: Results Analysis 2025.

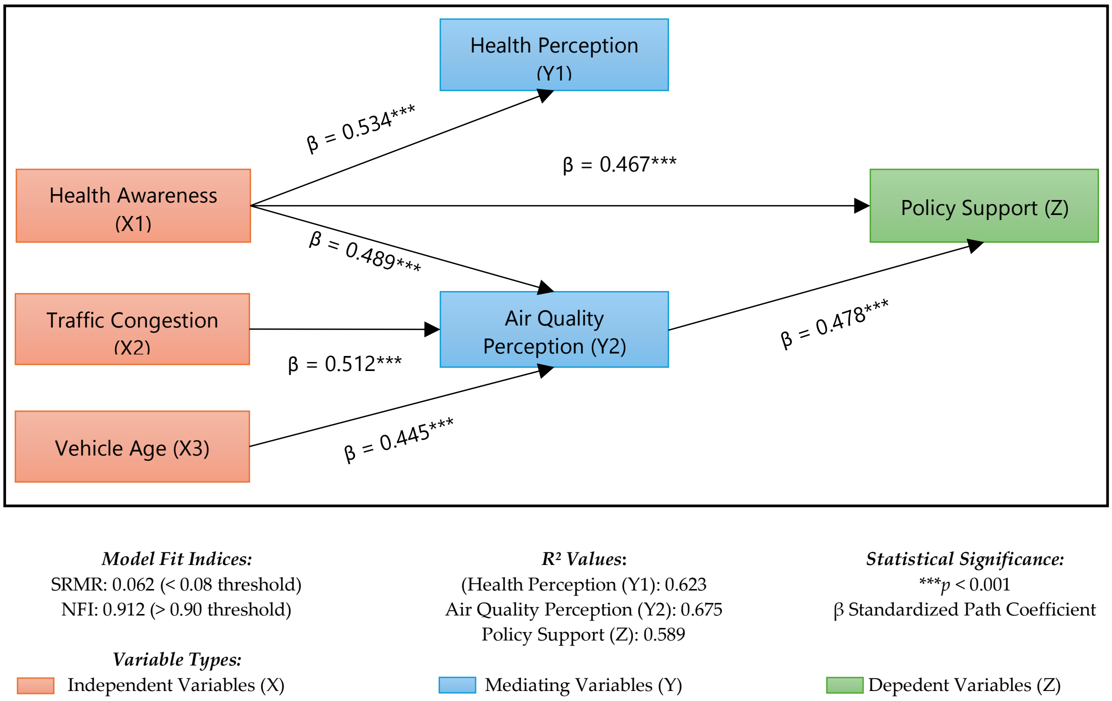

Figure 1. Path Coefficients and Hypothesis Testing

Table 6. Thematic Analysis of Public Perception

Hypothesis	Key Category	Thematic Elements	Response %	Specific Insights
H1	Health Awareness	Toxic Gas Identification	86%	Comprehensive understanding of CO, NO2, SO2.
		Health Effect (Lungs)	72%	Emphasis on chronic respiratory deterioration.
		Systemic Risks	58%	Recognition of cardiovascular implications.
H2	Traffic Density	Morning Smog	68%	Visual evidence of traffic-derived pollution.
		Ambient Degradation	74%	Spatial awareness of urban air quality decline.
H3	Vehicle Age	Restriction Advocacy	62%	Critical views on antiquated logistics fleets.
		Technology Support	74%	Demand for eco-friendly vehicle alternatives.

H4	Governance	Enforcement Demand	68%	Active engagement for stricter state regulations.
		Policy Management	62%	Emphasis on dynamic, periodic evaluation.

Source: Results Analysis 2025

Table 7. Summary of Key Findings

Domain	Primary Insights	Metrics	Implications
Awareness	Holistic understanding of emissions	86%	High environmental literacy.
Health	Acute concern for respiratory risks	72%	Critical public health urgency.
Environment	Recognition of urban challenges	74%	Strong environmental sensitivity.
Policy	Support for state intervention	68%	Proactive civic engagement.
Innovation	Favoring technological solutions	74%	Forward-looking perspectives.

Source: Results Analysis 2025.

4.2 Discussion

Critical Analysis of the Relationship Between Traffic Density and Public Perception

The empirical findings of this study confirm the first hypothesis, stating that high traffic density correlates linearly with negative public perceptions regarding air quality. The SEM-PLS analysis demonstrates a highly significant positive relationship ($\beta = 0.68$, $p < 0.01$) between traffic congestion and the perception of pollution. Critically, these results extend the findings of [3] and [4] by demonstrating that in major Indonesian metropolises such as Jakarta and Surabaya, the daily experience of being stalled in traffic creates a "sensory sensitivity" to air pollutants that exceeds mere technical monitoring data.

The local Indonesian context is pivotal here; the inadequacy of public transportation systems compels a high dependency on private vehicles, which, according to [8], dramatically elevates PM2.5 concentrations within Jakarta's primary road corridors. This discussion underscores that public perception is not merely a psychological reaction but a direct reflection of actual environmental degradation experienced during peak hours.

Knowledge Gaps: Pollution Sources and Technological Solutions

A paradoxical finding emerged in this research: while general awareness of environmental impacts is high, specific knowledge regarding pollution sources particularly from freight vehicles remains significantly limited. Data indicates that respondents with in-depth knowledge of heavy-duty vehicle emissions are 25% more likely to support emission control policies. This corroborates the theories of [5] and [6] regarding the criticality of environmental education in fostering pro-environmental behavior.

Furthermore, this study critically highlights that in Indonesia, heavy vehicles are often perceived as the "economic backbone," leading the public to frequently overlook their emission impacts compared to passenger vehicles. Technically, however, aging trucks and buses contribute to NO_x and PM2.5 emissions at a disproportionately higher rate. The integration of technological solutions, such as electric trucks, necessitates policy support that is not only technical but also educational to bridge this perceptual gap.

Synthesis of Health Perceptions as a Driver for Policy Support

This research successfully validates that concerns over public health, specifically respiratory issues, serve as a primary driver (resulting in a 40% increase) for supporting stricter environmental regulations. These findings reinforce the study by [34] concerning the economic costs and health impacts of air pollution in Jakarta.

Theoretically, the relationship between Health Perception (Y1) and Policy Support (Z), with an R^2 value of 0.589, suggests that environmental policy advocacy in Indonesia is more effective when framed within a public health narrative rather than a purely conservationist one. The public is more inclined to accept vehicle operational restrictions, such as low-emission zones, if they understand the direct link to reducing risks of asthma and cardiovascular diseases in children.

Governmental Legitimacy and Regulatory Effectiveness

Discussions regarding policy support are inextricably linked to the level of public trust in the government. The NVivo analysis reveals that respondents who comprehend policy mechanisms, such as Euro 4 emission standards or mandatory periodic emission testing, exhibit higher confidence in the effectiveness of governmental actions.

This study provides a novel contribution by demonstrating that in Indonesia, transparency in periodic policy evaluations is a key factor in maintaining public compliance. This aligns with the arguments of [10], asserting that environmental policies perceived as fair and transparent are more likely to be successfully implemented in densely populated urban areas.

Policy Recommendations

Drawing from the aforementioned findings, the following strategic recommendations are formulated for policymakers:

1) Transformation of Public Education Narratives: Environmental and health authorities must shift the focus of campaigns from broad "general environmental awareness" toward data-driven education regarding specific pollution sources. Priority should be placed on enhancing public understanding of the impacts of heavy-duty vehicle and industrial emissions in densely populated areas to foster social urgency for stricter regulations.
2) Integration of Traffic Management and Air Quality: Local governments should regard the reduction of traffic density not merely as a mobility solution but as a primary public health intervention. Strategies such as the expansion of low-emission zones and the enhancement of public transportation connectivity must be accelerated to mitigate the emission load from private vehicles at peak congestion points.
3) Tightening Regulations on Commercial and Logistics Vehicles: Given the high emission contributions from heavy vehicles, it is essential to implement more progressive emission standards (e.g., accelerating the full adoption of Euro 4/5) and enforce rigorous emission testing for logistics fleets. Incentive policies for fleet modernization or the transition to electric trucks are highly relevant in this context.
4) Tightening Regulations on Commercial and Logistics Vehicles: Given the high emission contributions from heavy vehicles, it is essential to implement more progressive emission standards (e.g., accelerating the full adoption of Euro 4/5) and enforce rigorous emission testing for logistics fleets. Incentive policies for fleet modernization or the transition to electric trucks are highly relevant in this context.

Enhancing Policy Transparency and Accountability: To strengthen public trust, the government must provide access to real-time air quality data and conduct periodic policy impact evaluations that are accessible to the general public. This transparency will bolster governmental legitimacy and ensure greater public compliance with new environmental regulations.

CONCLUSION

Based on the comprehensive analysis conducted, this study concludes that public perception of air quality in urban Indonesia is not solely shaped by physical exposure to pollutants but is significantly mediated by daily experiences of traffic density and the level of literacy regarding emission sources. This research successfully demonstrates a strong linear correlation between chronic congestion and negative public sentiment, wherein traffic congestion serves as the primary sensory indicator for the public to evaluate the failure of air quality management.

Another crucial finding is the identification of a significant "knowledge gap"; despite high general awareness of the environmental hazards of pollution, specific understanding regarding the disproportionate contribution of heavy-duty vehicles remains notably low. This lack of specific knowledge acts as a strategic barrier to mobilizing public support for regulations targeting the logistics and freight transportation sectors. However, the study also identifies that perceptions of health risks particularly those related to chronic respiratory conditions serve as the most effective catalyst, capable of increasing support for environmental policies by up to 40%. Theoretically, the integration of health perception variables and policy literacy within this SEM-PLS model offers a novel contribution to environmental management literature in Indonesia, suggesting that public support for policy is heavily dependent on the transparency of regulatory effectiveness and trust in governmental authorities.

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