



# Public opinion about restrictive driving policy: Does political affiliation matter? A case study of odd-even restrictive driving policy in Delhi, India

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## ABSTRACT

Public opinion and their support for any new government policy depend on their beliefs on acceptance, intrusiveness, and effectiveness. Considering a varying degree of social and cultural heterogeneity, this study investigates the array of political affiliation, which analyzes the influence of political affiliations on assessment and acceptance of the restrictive driving transport policy. A case study on an *odd-even restrictive driving policy* implemented during November 4–11, 2019, in Delhi (India) is undertaken using quantitative research methods. The conceptual model was first empirically tested with 275 responses from male residents using partial least squares structural equation modeling and then with necessary conditions analysis for robustness of the findings. The findings show that political affiliation positively influences perceived policy effectiveness, policy fairness, and policy acceptance. This study may help policy-makers and regulators to design measures and interventions that influence broader public perspective related to the odd-even restrictive driving policy through political affiliation.

## 1. Introduction

Environmental protection measures for reducing vehicle emissions (Linn and McConnell, 2019) is the need of the hour for a healthy environment and long-term social benefits (Wicki et al., 2019); however, further research is required for proposing such measures and identifying the appropriate policy choices (Haque and Ntim, 2018). In addition, the inducement of environment-friendly behavior among cross-cultural human society is palpable for world environment bodies and governments (Kulin and Johansson Sevå, 2019). It leaves a critical concern primarily for any government undertaking any such innovative initiatives or mechanisms.

During the last decade, the growth dimension of any country involved the overarching sustainability concept of inclusive urban development (Corsini et al., 2020), whereas the environmental management concept is taking shape as a decentralized approach, community participative, and a holistic view (Kapoor, 2001). With regard to spreading of self-awareness, the residents of bigger cities are often concerned about critical issues (Sodiq et al., 2019), such as higher air quality index (Mishra and Goyal, 2014), waste mismanagement, waterlogging, and erratic transportation (Sharma et al., 2019). For

example, an exponential increase in motor vehicles goes hand-in-hand with fast-track urbanization (Corsini et al., 2020) in various countries, primarily the developing nations. Song et al. (2019) noticed that vehicular traffic emerged as the most significant contributor to bad air quality leading to deterioration of human health. Under such circumstances, the general public is dependent on the government regarding implementation of innovative solutions and sustainable use of resources.

Considering public demand and necessity of time, the government implements various possible mechanism (Schuitema et al., 2010) to reduce vehicle emissions, such as increased parking fees (Wang et al., 2014), higher vehicle registration tax (Han and Li, 2021), and exercising restrictive driving policies (Liu et al., 2016). The restrictive driving policy is a measure implemented in many countries to curb air pollution; for example, alternate days driving or restrictive driving schemes in India (Mishra, 2019), 'short-run' in Argentina (Ramos et al., 2017), Mexico City (Guerra et al., 2017), and Beijing (Wang et al., 2014). Past studies have found that positive effect of restrictive driving policies lasts only for short duration. After the initial period, citizens find or curate the tactics to escape the rules of restrictive driving policies (Ma & He, 2016). Thus, other the policy features, the role of other factors such as citizen participation (Mjahed Hammami et al., 2018), national culture (Vitolla

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et al., 2019), and governance mechanisms (Haque and Ntim, 2018) becomes more important in the implementation of such government policies (Luan et al., 2013; Schuitema et al., 2010). Anderson et al. (2019) suitably flagged that, in a democratic society, the support from citizens is critically essential for the long-term functioning of such initiatives and creates a positive impact on the environment (Yildiz and Karan, 2020).

Thus, understanding public support to transport policies aimed at improving environment is crucial from both theoretical and practical perspective. This research aims to explore the role of political affiliation on acceptance of restrictive driving policy. In the extant literature, political affiliation of the citizens has been considered as one of primary force behind their support to climate and environment related policies (Drews & Van Den Bergh, 2016). However, there exists scant studies examining the effect of political affiliation on the perception and acceptance of restrictive driving policies. This study uses theoretical premises from Social Identity Theory (SIT) to understand the positive bias manipulation induced by citizen's political affiliation with ruling political party (Milner, Rice, & Rice, 2019). By extending their argument, this research has proposed that the level of the *political affiliation of citizens* with the "*ruling political party government*" may result in positive biases related to evaluation of such restrictive driving policy features among citizens and influence the perceived policy features, i.e., *perceived policy effectiveness and policy fairness*. In accordance, this research explores the following research questions (RQ):

RQ1: Does political affiliation influence the perceived features of restrictive driving policy in the mind of citizens?

RQ2: What is the role played by political affiliation in acceptance of restrictive driving policy?

This research work has chosen an '*odd-even restrictive driving policy*' implemented by the state government of Delhi, India, which was implemented for the first time in 2016 (Chowdhury, et al., 2017) and even later till the year 2019 to reduce air pollution and promote environmental sustainability.

## 2. Literature review

This section provides overview of relevant literature and the conceptual framework of the study. First subsection provides a summary of past studies conducted for analyzing the antecedents and outcome of restrictive driving policies across the different countries. Next subsection discusses the conceptual framework for analyzing how political affiliation of citizens can influence the policy related opinions and acceptance among citizens.

### 2.1. Background

Extant literature has suggested that citizen's political interests or political affiliation greatly influence their perception about social and political issues (Huddy & Bankert, 2017; Mason, 2015; Efron & Knowles, 2015). Social Identity Theory (SIT) explains the citizen's bias towards the government policies or various political/social issues through the process of self-categorization (Stets & Burke, 2000). Social identity of a person refers to his knowledge about the membership to a social group and help him to position himself in society relative to his peers, family, friends, and others (Jenkins, 2014; Rubin and Hewstone, 2004). Individuals naturally tend to identify themselves with different social groups and self-categorize themselves as part of a group through manifestation of the characteristics that aligns with their in-group's behavior and philosophy (Hogg & Abrams, 1988; Hornsey, 2008). Further, individuals also self-categorize themselves as a supporter of a political party based on its philosophy and expresses their identification with the political party in various social contexts (Shayo, 2009; Fowler & Kam, 2007). Self-categorization by individuals as a supporter of a political party also encourages them to display the behaviors that aligns

with the behavior and belief of political party which they are supporting (Huddy, 2001). Thus, the phenomenon of self-categorization to different political groups induces the bias in the opinion of citizens about various issues related to public policy, climate change, environment policies etc.

When self-imposed political affiliation becomes salient, it plays a major role in shaping the citizen's attitude or opinion for several social and cultural issues (Cohen, 2003). However, it has been observed that political affiliation also shapes the opinion of citizens about environmental and climate related issues (Tobler, Visschers, & Siegrist, 2012; Drews & Van den Bergh, 2016, Jagers, Löfgren, & Stripple, 2010). Further, due to lack of knowledge about environment related issues and policies, citizens might also be influenced to form a positive/negative bias driven by their political affiliation (Buttel & Flinn, 1978; Mayne & Hakhverdian, 2017). For example, Mayer (2017) and Malin et al. (2019) found that political identity influences policy preferences for the non-conventional oil and gas policy.

As the success of any such environment friendly initiative such as restrictive driving policy majorly depends on people's acceptance, their participation, and assistance (Poortinga et al., 2004). For example, Nordfjærn and Rundmo (2019) analyzed that for an innovative transport policy, the acceptance of policies relied upon citizens' beliefs and opinions. It is critical to examine the role of political affiliation in shaping the opinion and attitude towards the restrictive driving policy. This research explores how political affiliation of a citizen influences the evaluation of a restrictive policy and subsequent acceptance/support for the policy. Previous studies have stressed that the citizens evaluation of a restrictive driving policy can be captured with the help of two perceived policy features i.e., '*perceived policy effectiveness*' and '*policy fairness*' (Huber et al., 2019). This research aims to explore how political affiliation of citizen influences their perceptions about the effectiveness and fairness of the restrictive driving policy. Further, it also aims to find the effect of political affiliation on the policy acceptance behavior of citizens.

### 2.2. Conceptual framework

The interplay of "*political affiliation*" and "*restrictive driving transport policy*" opinion-based research builds on the argument that '*perceived policy effectiveness*' and '*policy fairness*' are two critical features on which citizens evaluate a policy. The level of "*political affiliation with the ruling political party*" would cause a more favorable evaluation of policy features, i.e., effectiveness and fairness. Further, the higher levels of effectiveness and fairness may lead to more policy acceptance. The proposed theoretical framework is displayed in Fig. 1. In the following section, we would discuss the theoretical framework and the underlying hypothesis with their associated outlook.

#### 2.2.1. Political affiliation

One of the main objectives of this research is to explore the role of a citizen's political affiliation in transport policy evaluation and its acceptance. Political affiliation refers to individual's trust and liking for the party's philosophy and its political leaders (Abrams, 1994). Past studies have found the influence of political affiliation on the attitude of citizens towards environment policies. In an example, Cacciatore et al. (2012) found the influence of political affiliation on citizen's belief toward the usage of biofuels in the USA. They deliberated on political partisanship, knowledge of the social community, and people's media usage. On the contrary, a political stalemate was also noticed in the white house administration on a collaborative and combative environmental policy (Stalemate, 2014). It indicates that political affiliation could influence an individual's perception and belief toward a pro-environmental policy (Cheung et al., 2019; Drews & Van Den Bergh, 2016).

Any restrictive policy launched by the government, ruling political party plays instrumental role in designing and enforcing it. Thus, it can be inferred that ruling political party believes in the principle and

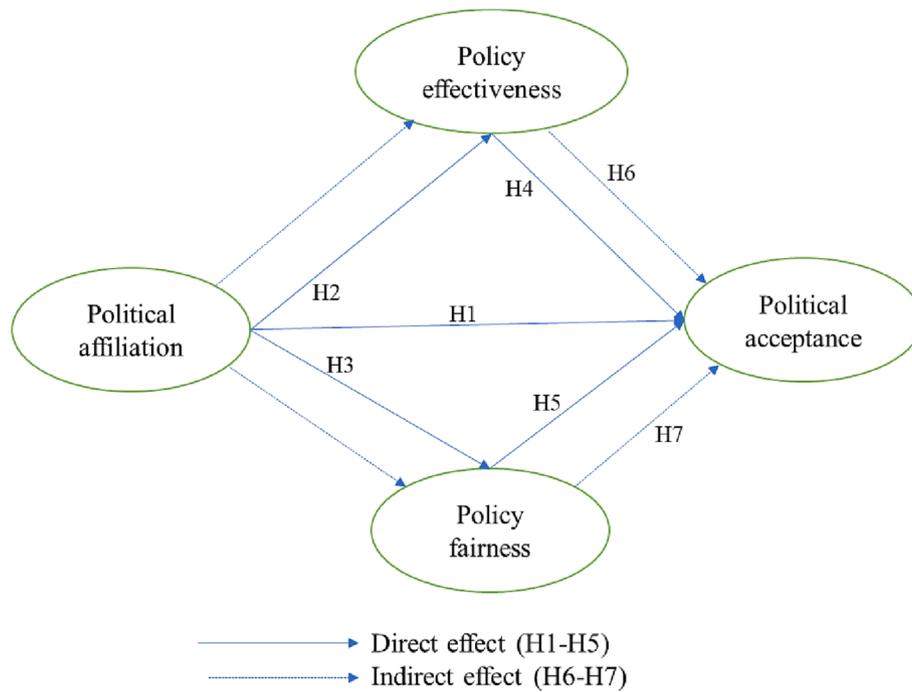


Fig. 1. Theoretical Framework.

effectiveness of the proposed policy. Further, ruling political party and its prominent political leaders market the policy, its benefits and persuade the citizens to follow the same. However, the opposition political parties are inclined to oppose such innovative initiatives of the government by protesting and not following the policy rules (Linde, 2018). Articulation of support and protest for the policy by political leaders will contextualize the policy related discussion into political polarization (Van Boven, Ehret, & Sherman, 2018). Hence, political groups and political ideology would also become more prominent in public discussions about the policy which would further lead to political polarization negatively affecting the policy effectiveness (Linde, 2018). Further, restrictive driving policies also put certain restrictions on the citizens. Hence, some citizens may also find it as violation of their democratic rights (Ma & He, 2016). Unlike other pro-environment policies, restrictive driving policies has immediate effect on how citizens commute within the city. Further, it also restricts their freedom to drive their vehicle at any time or any day. Thus, restrictive driving policy in any democratic country is likely to face resistance from citizens due their self-interest and political polarization. These factors might critically undermine the policy effectiveness and its public support.

Despite the political polarization and self-interest of citizens, social identity of an individual about his belongingness to ruling political party might play an important role in shaping his beliefs and support for the policy (Haslam et al., 2009; Milner et al., 2019). Higher level of political identification and affiliation with the ruling political party would insist users to show more confirmatory behavior with the policies and philosophy of the ruling political party and its leaders (Fielding et al., 2012). Thus, the higher political affiliation of a citizen with a ruling political party is likely to introduce a positivity evaluative bias among citizens while judging the action/policy of the government (Hiel and Mervielde, 2002). In this context, researchers have described positivity bias as an individual's disposition to evaluate the range or variety of government actions/policies positively (Sniderman et al., 1982). Consequently, citizens having stronger political affiliation with the ruling government are likely to have a higher positivity bias for the government's policies, which results in a more favorable evaluation of the government's policy. Hence, we propose that political affiliation is likely to positively influence policy-related beliefs i.e. perceived policy

effectiveness and policy fairness. Further, it is suggestive that the positive effect of political affiliation on policy-related beliefs would positively influence policy acceptance. Hence, the following hypotheses are proposed on people's perception:

- H1: Political Affiliation with the ruling party is likely to have a positive influence on policy acceptance.  
 H2: Political Affiliation with the ruling political party is likely to have a positive influence on perceived policy effectiveness.  
 H3: Political Affiliation with the ruling political party is likely to have a positive influence on perceived policy fairness.

#### 2.2.2. Perceived policy effectiveness

Perceived political effectiveness refers to the citizen's belief in the policy's capability to achieve its desired objectives (Eriksson et al., 2006). For example, in a restrictive driving policy, citizens would evaluate its effectiveness in reducing emissions. Perceived policy effectiveness is one of the prominent features that influence policy support among citizens (Bamberg and Rölle, 2003), and the practical outlook of such policy effectively compels policy regulations. This research also proposes that the perception of perceived policy effectiveness would motivate users to accept, comply and propagate with the policy. However, these policies seem to put some or other restrictions on individual rights; hence, citizens may be willing to make this trade-off in a case when policy seems to be effective in achieving its environmental goals (Huber et al., 2019; Jain et al., 2021). Therefore, it can be proposed that a policy's perceived benefits for the environment to be a key driver for policy acceptance.

- H4: Perceived policy effectiveness has a positive effect on policy acceptance

#### 2.2.3. Policy fairness

Any public policy is associated with the "fairness doctrine" or "beliefs" (Eriksson et al., 2008). These policies are primarily evaluated concerning the major normative categories: moral rights, social justice, individualistic approach, or group thought (Huber et al., 2019), economic efficiency, and character effects (Andrew and Honig, 2019).

By extending the argument of fairness in relation to the restrictive driving policy, it is observed that the citizens' outlook on policy legitimacy depends on the individual or locality-based attributes. On the one hand, individuals may consider it a violation of their privacy, as it restricts their vehicle usage and may consider it an unfair policy. On the other hand, the locality-based features such as public transport connectivity may also influence the policy's perceived fairness, and driving restrictions might not seem unfair. On the contrary, localities not well connected with public transports might not view the restrictive driving policy fairly. Hence, the perception of fairness at the individual and locality levels plays a crucial role in the policy's acceptance and support. Past studies have confirmed the positive effects of perceived policy fairness on policy acceptance and its support (Eriksson et al., 2006; Huber et al., 2019). Hence, this research also proposes the following:

H5: Perceived policy fairness has positive effect on policy acceptance.

### 2.2.4. Mediation

As proposed in the previous section, political affiliation with the ruling government is likely to influence the *policy beliefs* and *evaluation* of the policy adopters. Political affiliation drives the policy adopters to have a more favorable opinion or assessment about the policy or any social cause measures such as environmental policies (Hiel and Merielde, 2002). These optimistic beliefs about the environmental policy might be inherently driven because of political affinity to the government or due to political interests of the policy adopters (Sniderman et al., 1982), and it plays a critical role in garnering support and acceptance among the citizens (Eriksson et al., 2006). As policy-related beliefs are a significant antecedent of policy support/acceptance, this study proposes that political affiliation might also influence policy acceptance via influencing policy-related beliefs. Hence, we present the following hypotheses for the indirect effect of political affiliation on policy acceptance through perceived policy effectiveness and perceived policy fairness.

H6: Perceived policy effectiveness will have a mediating effect on the relationship between political affiliation and policy acceptance.

H7: Perceived policy fairness will have a mediating effect on the relationship between political affiliation and policy acceptance.

## 3. Research methodology

### 3.1. Measures

All the measures are adapted from previous literature and are modified to match the objective of this study (refer Appendix A). "Political affiliation" outlook was adapted from Abrams (1994). "Perceived policy effectiveness" was measured using a four-item scale adapted from the studies of Eriksson et al. (2008) and Liu et al. (2016). "Perceived policy fairness" was measured using a three-item scale adapted from Eriksson et al. (2008). "Policy acceptance" was adapted from Chen and Zhao (2013). The questionnaire comprised of two parts. Part one captured demographical and travel details of respondents, whereas, part two comprised of main study variables on a seven-point Likert scale with anchors 1 = Strongly Disagree to 7 = Strongly Agree.

The questionnaire was shown to four academicians, four industry corporates, and three executives working in the Ministry of Road Transport and Highways, the Government of India. The experts suggested minor modifications to a few items of the questionnaire. Next, a pilot study was conducted with 67 respondents. The reliability of all the variables was higher than 0.07. These results were again discussed with the experts, and following their recommendation, the data was collected for the main study.

### 3.2. Data collection

A survey was conducted between November 4 and November 15, 2019, in India to collect the data through a non-probabilistic approach. The potential respondents primarily comprised private cars driven by males who travel to Delhi region during the above period. Commercial vehicles and private cars driven by females were exempted from the restrictive driving policy; hence, they were not considered for the study. Total 515 questionnaires were distributed to the respondents, and 320 were returned. After discarding incomplete responses, a total of 275 valid responses were received with an effective response rate of 53.40 percent. Table 1 shows the sample has 54 percent of the respondents with age more than 30 years. It is also found that approximately 56 percent of the respondents have a monthly income of more than (INR) 75,000. Further, it is found from the responses that more than 55 percent of the respondents spent more than 60 min on their daily commute.

### 3.3. Common method bias and non-response bias

After collecting the data, Harmon's single factor test and common method factor test were conducted to address common method bias (Podsakoff et al., 2003). Factor analysis with zero rotation resulting in four variables with single not accounting for the majority of variance validated the Harmon's single factor test (Hair et al., 2016). A non-related common latent variable had low correlations with the study's other variables, which validated the common factor approach. Hence, common method bias was not present in this study. To account for non-response bias, the significant differences between the first and last quartile of data were tested by a two-tail *t*-test (Armstrong and Overton,

**Table 1**  
Descriptive Statistics of the Sample.

Variable	Classification	Count	Percentage
Age	18–25 years	50	18.18
	26–30 years	75	27.27
	31–35 years	80	29.09
	More than 35 years	70	25.45
Monthly Income (in INR.)	Less than 50,000	53	19.27
	50,001–75,000	67	24.36
	75,001–100,000	96	34.91
	More than 100,000	59	21.45
Education	Matriculation	42	15.27
	Graduation	132	48.00
	Post-graduation	95	34.55
	PhD	6	2.18
Occupation	Government service	65	23.64
	Private service	64	23.27
	Business	67	24.36
	Education	47	17.09
	Unemployed	32	11.64
Daily Commuting Time	Less than 30 min	47	17.09
	30–60 min	75	27.27
	61–90 min	67	24.36
	91–120 min	55	20.00
	More than 120 min	31	11.27
Number of cars	1	120	43.64
	2	130	47.27
	More than 2	25	9.09
Last digit of car	Odd number	154	56.00
	Even number	102	37.09
	Both (I have two cars with odd and even number)	19	6.91

1977). The findings showed no significant differences between the two quartiles of data, which validated non-response bias.

#### 4. Analysis and findings

This study used partial least squares structural equation modeling (PLS-SEM) for analyzing the primary data and then necessary conditions analysis for robustness of the findings. PLS-SEM is suitable for exploratory study, complex model, small sample size and poses less restrictions on data (Hair et al., 2016; Peng and Lai, 2012). Therefore, this study relied on PLS-SEM for the analysis. SmartPLS 3 was used to test the structural model of this study (Ringle et al., 2015). PLS-SEM analysis was carried out in two stages. Stage 1 includes reliability and validity assessment whereas stage 2 carried out the hypotheses testing using multivariate approach and average scores of all the constructs respectively.

##### 4.1. Measurement model analysis

The sample size of 275 was sufficient for structural model equation analysis since the sample is higher than five times the number of items (1:5 thumb rule and number of items is 13, therefore sample is higher than 65) (Bentler and Chou, 1987; Golob, 2003). For PLS-SEM, thumb rule is 10 times the exogenous variable directed towards an endogenous variable (three exogenous variable and one endogenous variable resulting in minimum sample of 30) Hair et al., 2016). Further, as per recommendations of Golob (2003) and Kline (1998), sample size should lie between 200 and 400 for structural equation modeling. Furthermore, previous studies on transportation context relied on similar size for analysis (Nordfjærn and Zavareh, 2017; Ünal et al., 2019). Therefore, this study relied on sample size of 275 for the analysis.

The Cronbach's alpha, composite reliability and average variance extracted (AVE) values of all the constructs (refer Appendix A) was higher than the recommended values of 0.700, 0.708 and 0.500 respectively (Hair et al., 2016). The indicator item loadings ranged between 0.691 and 0.916, validated indicator reliability as values are higher than the recommended value of 0.600 (Nunnally, 1978).

Discriminant validity was addressed by Fornell and Larcker (1981) criterion that states that the square root of AVE of the construct should be higher than all the inter-construct correlations (refer Table 2). Further, HTMT values ranged between 0.432 and 0.837, the values being lower than 0.850 further validated discriminant validity (Hair et al., 2016; Henseler et al., 2015). Furthermore, crossloadings indicate that all the corresponding loadings on other constructs are lower than the item's loading on its own construct (refer Table 3), confirming discriminant validity (Hair et al., 2016).

**Table 2**  
Discriminant Validity of the Constructs.

Construct	Political affiliation	Policy effectiveness	Policy fairness	Policy acceptance
Political affiliation	<b>0.788*</b>	0.432 <sup>#2</sup>	0.638	0.837
Policy effectiveness	0.440 <sup>#1</sup>	<b>0.922</b>	0.647	0.670
Policy fairness	0.587	0.599	<b>0.907</b>	0.764
Policy acceptance	0.765	0.593	0.666	<b>0.859</b>

\*Diagonal values represent square root of AVE; <sup>#1</sup>The values below the diagonal represent inter-construct correlations; <sup>#2</sup>The off-diagonal values represent HTMT values.

PoA. political affiliation; PE. perceived policy effectiveness; PF.. perceived policy fairness; PA. policy acceptance.

**Table 3**  
Crossloadings of the Items of the Constructs.

Items	Political affiliation	Policy effectiveness	Policy fairness	Policy acceptance
PoA1	<b>0.691</b>	0.179	0.258	0.323
PoA2	<b>0.770</b>	0.171	0.391	0.408
PoA3	<b>0.889</b>	0.523	0.608	0.850
PE1	0.437	<b>0.890</b>	0.553	0.585
PE2	0.385	<b>0.911</b>	0.547	0.539
PE3	0.404	<b>0.903</b>	0.541	0.566
PE4	0.391	<b>0.914</b>	0.568	0.489
PF1	0.580	0.623	<b>0.915</b>	0.690
PF2	0.489	0.452	<b>0.891</b>	0.547
PF3	0.517	0.538	<b>0.914</b>	0.558
PA1	0.741	0.472	0.657	<b>0.916</b>
PA2	0.604	0.409	0.455	<b>0.791</b>
PA3	0.619	0.641	0.587	<b>0.854</b>

##### 4.2. Structural path analysis

Table 4 shows that the model explained 69.00% of the variance of policy acceptance ( $R^2 = 0.690$ ). Further,  $Q^2$  values ( $Q^2 = 0.502$ ) of policy acceptance being more than 0 also validated the predictive relevance of the model (Geisser, 1974; Stone, 1974). Variables, i.e., perceived policy fairness ( $R^2 = 0.342$ ;  $Q^2 = 0.275$ ) and perceived policy effectiveness ( $R^2 = 0.190$ ;  $Q^2 = 0.159$ ) also obtained sufficient  $R^2$  and  $Q^2$  values. Furthermore, Cohen's  $f^2$  values showed that all the structural paths obtained medium and high effect size (Cohen, 1988), as the suggested values of effect size for small, medium and large effect sizes are 0.020, 0.150 and 0.350, respectively (Chin, 2010).

The results showed that political affiliation is significantly associated with the policy acceptance ( $\beta = 0.540$ ,  $p = 0.000$ ), perceived policy effectiveness ( $\beta = 0.440$ ,  $p = 0.000$ ), and perceived policy fairness ( $\beta = 0.587$ ,  $p = 0.000$ ), thus supporting the hypotheses H1, H2, and H3. Perceived policy effectiveness ( $\beta = 0.229$ ,  $p = 0.000$ ) and perceived policy fairness ( $\beta = 0.212$ ,  $p = 0.000$ ) significantly influenced policy acceptance, which showed support for hypotheses, H4 and H5. Hence, it shows that the policy variables significantly influenced policy acceptance. Next, the mediation analysis is discussed below.

##### 4.3. Mediation analysis

This study followed the approach suggested by Preacher and Hayes (2008) for multiple mediation testing. The indirect effect was assessed with bias-corrected confidence interval; hence, it should not include 0 for mediation (Preacher and Hayes, 2008). Partial mediation occurred when both the direct and indirect effects were significant, full mediation when direct effect was insignificant but indirect effect was significant, and no mediation when neither direct effect nor indirect effect was significant. Table 5 shows that perceived policy effectiveness (direct effect  $\beta = 0.540$ ,  $p = 0.000$ ; indirect effect:  $\beta = 0.101$ ,  $p = 0.000$ , LCI =

**Table 4**  
Hypotheses Testing (Direct Effect Analysis).

Hypotheses	Path	Path coefficient	LCL	UCL	Decision
H1	Political affiliation -> Policy acceptance	0.540***	0.444	0.637	Accepted
H2	Political affiliation -> Policy effectiveness	0.440***	0.345	0.545	Accepted
H3	Political affiliation -> Policy fairness	0.587***	0.499	0.669	Accepted
H4	Policy effectiveness -> Policy acceptance	0.229***	0.113	0.325	Accepted
H5	Political fairness -> Policy acceptance	0.212***	0.108	0.324	Accepted

\* $p < 0.05$ , \*\*\* $p < 0.01$ , \*\*\*\* $p < 0.001$ .

**Table 5**  
Mediation Hypotheses Testing (Indirect Effect Analysis of Policy Effectiveness and Policy Fairness).

Hypotheses	Indirect Path	Path coefficient	LCL	UCL	Decision
H6	Political affiliation -> Policy effectiveness -> Policy acceptance	0.101***	0.048	0.158	Accepted
H7	Political affiliation -> Policy fairness -> Policy acceptance	0.124***	0.062	0.198	Accepted

\*p < 0.05, \*\*\*p < 0.01, \*\*\*\*p < 0.001.

0.048, UCI = 0.158) and perceived policy fairness (direct effect  $\beta = 0.275$ ,  $p = 0.000$ ; indirect effect:  $\beta = 0.124$ ,  $p = 0.000$ , LCI = 0.062, UCI = 0.198) partially mediated the relationship between policy affiliation and policy acceptance, thereby supporting hypotheses H6 and H7. Next, the necessary conditions analysis is presented below.

4.4. Necessary conditions analysis

Necessary conditions analysis (NCA) is an advanced research technique that tests the necessary but not sufficient conditions for obtaining desired outcomes (Dul, 2016). Prior research has applied NCA approach in transportation research and operations management (de Vries et al., 2017; Dul et al., 2010; Jain et al., 2022). The latent variables obtained from PLS-SEM analysis were used for subsequent NCA analysis (Richter, et al., 2020).

First step in NCA is to analyze the scatter plots of independent variables with dependent variables. The scatter plot includes OLS

regression line, ceiling envelopment with free disposal hull (CE-FDH) line and ceiling regression with free disposal hull (CR-FDH) line (Dul, 2016). The necessary conditions are indicated by the empty space in the upper left corner of the graph (Dul, et al., 2020). CR-FDH is based on parametric technique assuming linear ceiling line and CR-FDH is based on non-parametric approach having no assumption on ceiling line function and it is a non-decreasing step function (Dul et al., 2020). Fig. 2 shows NCA scatter plots of political affiliation, policy effectiveness and policy fairness with policy acceptance and indicates them as necessary conditions.

Next step was to obtain the effect size and its significance. The effect size was calculated by dividing the ceiling zone by slope as it represents the size of the empty space as a fraction of total space along with ceiling zone (refer Table 6). The effect size is classified as small for value between 0 and 0.1, medium for values between 0.1 and 0.3, high for values between 0.3 and 0.5 and very high for values higher than 0.5 (Dul, 2016). Table 6 shows that political affiliation, policy effectiveness and policy fairness have medium effect size. Further, significance of effect size through CE-FDH approach indicates that all these variables are necessary conditions for policy acceptance (Dul et al., 2020). Therefore, NCA analysis validates the results obtained through PLS-SEM.

5. Discussion

This study provides interesting findings about the role of political affiliation of citizens in influencing their opinions and acceptance for an environment friendly policy. Considering the substantial differences between political parties, supporters, and other associated issues, significant conflicts have always surfaced while adopting and implementing any new policy. These conflicts become more vocal in case the focus areas pertain to carbon emissions, climate justice, water and waste

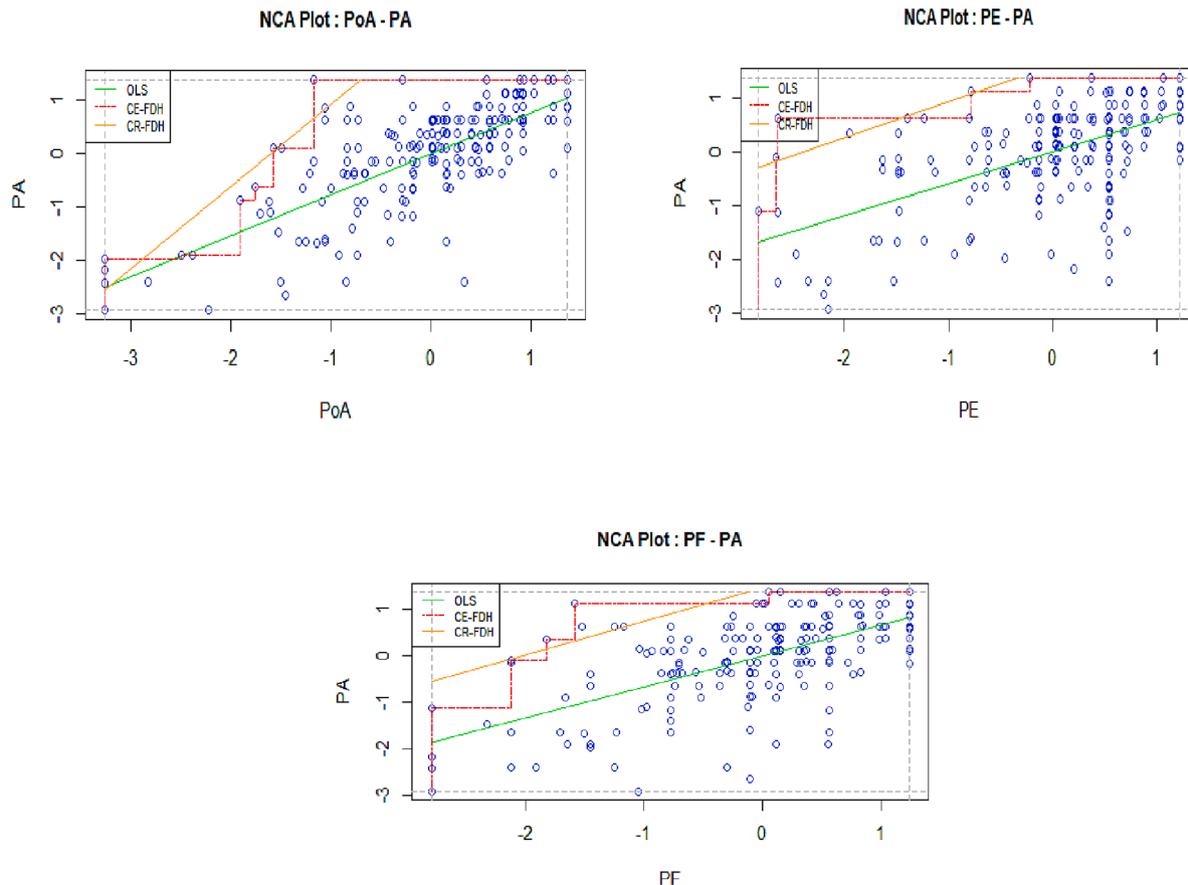


Fig. 2. Necessary Conditions Analysis Scatter Plots.

**Table 6**  
Necessary Conditions Analysis for Policy Acceptance.

Predictor	Ceiling zone	Accuracy (%)	Fit (%)	Scope	Effect size	p-value
Political affiliation	5.715	100%	100%	19.826	0.288***	0.000
Policy effectiveness	1.992	100%	100%	17.336	0.115***	0.000
Policy fairness	2.764	100%	100%	17.271	0.160***	0.000

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

management, and overall environmental sustainability (Linde, 2018). This study is major step towards understanding the process which political affiliation and artisanship may influence the adoption an environment friendly policy such as odd even restrictive driving policy.

In line with the proposed hypotheses and social identity theory, this study found that political affiliation influences the perception about restrictive driving policy among citizens. Citizens with higher level of political affiliation with ruling political party are more likely to favourably evaluate the driving policy as compared to those citizens with lower level of political affiliation. This finding is in line with previous studies examining the evaluative bias induced by the political affiliation while assessing the government regulations and policies (Haslam et al., 2009; Milner et al., 2019). Further, level of political affiliation with the ruling political party would cause a positive influence on perceived effectiveness and fairness of the restrictive driving policy (Suhardiman, et al., 2021). Thus, citizens with higher level of political affiliation are likely to show group confirmatory behaviour by forming more positive perception about any government policy (Tobler et al., 2012).

In tune with research findings, it has been indicated that the policy features, namely perceived policy effectiveness and perceived policy fairness, positively influence policy acceptance, and this compliments the previous literature (Eriksson et al., 2008; Huber et al., 2019). Thus, not only the political affiliation impacts the policy evaluation, but it also determines the acceptance and support for the restrictive driving policy. Hence, political affiliation influences environmental policy through perceived policy effectiveness and fairness. The conclusions of this study have been validated by both the survey method and necessary conditions analysis technique.

### 5.1. Theoretical implications

This research makes contribution to transport policy literature by analyzing the acceptance of a restrictive driving policy with social identity theory as theoretical premise. Social identity theory is relevant to analyzing the citizen's evaluative bias while analyzing their response to government policy. This study is among few to examine how political affiliation plays an important role in shaping the policy perception among citizens. When there is rise in the research studies which assesses citizen opinions about various environment friendly policies regulations (i.e. Mayne & Hakhverdian, 2017; Basseches et al., 2022), this study suggests that political affiliation will influence the debate about an environment friendly transport policy. Hence, researchers exploring transport policy should incorporate political bias while assessing citizen's opinions about a transport policy. Further, this study suggests the process through which political bias can influence perception of citizens about a transport policy.

### 5.2. Policy implications

The political affiliation could result in public acceptance of the odd-even restricted driving transport policy. Political affiliation influences policy-related features positively, and it further leads to policy acceptance and helps to build consensus for gaining support of such

experimental transport policies among the public. The social and political heterogeneity factors need to be addressed by the inter-linked Governments and engage with political opposition parties and parties with different views regarding the policy.

Bringing political actors from all political parties may save such experimental transport policies from becoming victims of political conflicts and individual interests and impact positively to maintain environmental protection with reduced traffic congestion. Considering the other dimensions, the government should also avoid making such transport /environmental policies, political stunts, and tools for scoring goals from the electorate's perspective.

For example, using environmental policies from an electorate's perspective might trigger unnecessary rivalry or opposition to environmental policy from actors with different political interests/objectives. Similarly, the effectiveness of experimental transport policies in democratic countries depends on their widespread acceptance, and it can be wise to keep such policies as a non-political agenda. Instead of keeping political actors at the center of the campaign for developing policy, the government may put the citizens and nature at the core of policy campaigning.

## 6. Limitations, future scope and conclusion

This research has a few limitations. First, the theoretical model is tested in response to only one restrictive driving policy in the capital of India. Though this city has people from all over India, it fails to represent the expectations of rural areas in terms of acceptance of such environmental and traffic congestion-based transport policies, which could be one of the future scopes. Second, this research has primarily explored the role of two policy-related beliefs, i.e., perceived policy effectiveness and fairness. Other policy-related beliefs may also be reconsidered and examined by future studies. Further, theory of planned behavior may be considered for analyzing individual behavior towards transport policies. Third, necessary conditions analysis approach provides robustness to empirical analysis. Future studies can also explore the ways of framing such opinions and the role of political leaders in building counter-narratives about policy on social media. Fourth, sample is skewed towards the age-group of 18–35 years, future studies may collect stratified sample for robustness of the findings. The cross-sectional data is another limitation of the study and future studies may collect longitudinal data for generalizability of the findings of the study.

### CRedit authorship contribution statement

**Kapil Kaushik:** Conceptualization, Methodology, Software, Investigation, Writing – original draft. **Nikunj Kumar Jain:** Visualization, Supervision, Data curation, Software, Formal analysis. **Piyush Choudhary:** Project administration, Writing – review & editing.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A

## Measurement Items of the Survey.

Construct	Item	Item Description	Loading	CA	CR	AVE
Political affiliation	PoA1	I agree with the basic ideals and vision of the ruling party	0.691	0.734	0.829	0.620
	PoA2	Ruling party represents people like me	0.770			
	PoA3	Ruling party works for the best interests of citizens of Delhi	0.889			
Perceived policy effectiveness	PE1	I perceive that the odd-even driving restriction policy to be effective	0.890	0.901	0.928	0.850
	PE2	I believe that the odd-even policy will lead to an improved environment in my municipality	0.911			
	PE3#	Odd-even policy is not effective in reducing smog pollution	0.903			
	PE4	I hope the odd-even policy can continue to be implemented	0.914			
Policy fairness	PF1	I believe odd-even policy is fair for me	0.915	0.892	0.923	0.822
	PF2	I believe odd-even policy is fair for other citizens	0.891			
	PF3	I believe odd-even policy is in best interest for everyone	0.914			
Policy acceptance	PA1	I am in complete favor of odd-even policy	0.916	0.820	0.893	0.737
	PA2#	I will use my car during odd-even policy	0.791			
	PA3	I am willing to participate in the odd-even policy	0.854			

#Reverse coded item; CA: Cronbach's alpha; CR: Composite Reliability; AVE: Average variance extracted.

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