

Original Research Article

Effects of Traffic Control Technology and Traffic Officers on Road Traffic Regulation in Ado-Ekiti, Ekiti State

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Abstract: This study investigated the effects of traffic control technology and traffic officers on road traffic regulation in Ado-Ekiti. Specifically, it examined the perceived effectiveness of automated traffic control systems such as Closed Circuit Television (CCTV), traffic lights, speed cameras and the role of Federal Road Safety Corps (FRSC), Nigeria Security and Civil Defence Corps (NSCDC), and Vehicle Inspection Officers (VIO) in enforcing traffic laws. A descriptive survey design was adopted. The population comprised motorists, commercial drivers, and commuters in the Ado-Ekiti metropolis. Using multistage sampling, 400 respondents were selected from 5 major junctions: Okeyinmi, Ijigbo, Ajilosun, Basiri, and Adebayo. Data were collected using a structured questionnaire titled “Traffic Regulation Effectiveness Questionnaire TREQ” with Cronbach’s $\alpha = 0.87$. Research Question 1 was analyzed using mean and standard deviation, while Research Question 2 and hypotheses were tested using multiple regression and ANOVA at a 0.05 level of significance. Results showed that traffic lights, $M = 3.52$, $SD = 0.61$, were perceived as the most effective technology, while traffic officers’ presence, $M = 3.48$, $SD = 0.58$, had a strong deterrent effect. Regression analysis revealed that traffic control technology $\beta = 0.41$, $p < .005$ and traffic officers $\beta = 0.33$, $p < .005$, significantly predicted effective traffic regulation, explaining 48.2% of variance. However, epileptic power supply and poor maintenance reduced technology effectiveness. It was concluded that technology and human enforcement are complementary. Recommendations include the installation of solar-powered traffic lights, the training of traffic officers on ICT, and public enlightenment campaigns.

Keywords: Traffic control technology, traffic officers, road regulation, Ado-Ekiti, FRSC

Introduction

Urbanization in Nigeria has led to a rapid increase in vehicular population, especially in state capitals. Ado-Ekiti, with an estimated population of 308,621 according to the 2006 census and projected 420,000 in 2024, is experiencing unprecedented traffic pressure (National Population Commission NPC, 2006; World Bank, 2024). The city serves as an administrative, commercial, and educational hub for Ekiti State, with institutions like Ekiti State University EKSU, Federal Polytechnic Ado-Ekiti, and Afe Babalola University attracting a daily influx of commuters.

Effective road traffic regulation is critical for safety, mobility, and economic productivity. Road Traffic Crashes (RTCs) remain a leading cause of death globally, with 1.19 million deaths annually (World Health Organization, WHO, 2023). In Nigeria, FRSC reported 5,081 crashes and 3,541 fatalities in Q1 2024 alone (FRSC, 2024). Ado-Ekiti is not exempt. Major junctions like Okeyinmi, Ijigbo, and Adebayo record frequent congestion, illegal parking, traffic light violations, and “okada” recklessness (Ogunlana & Adeyemi, 2023). It appears that Traffic congestion and poor regulation are major challenges in rapidly growing Nigerian cities. Ado-Ekiti, the capital of Ekiti State, has witnessed increased vehicular population, road crashes, and gridlock since 2020. Two major approaches dominate traffic regulation globally, such as Technology-based control and Human enforcement by traffic officers.

Traffic Control Technology refers to automated systems used to manage vehicular flow and enforce compliance without constant human presence. Common technologies include: traffic lights/signals, Closed Circuit Television (CCTV), Automatic Number Plate Recognition (ANPR), Speed Cameras, and Intelligent Transport Systems (ITS) (Papageorgiou et al., 2022). Lagos State’s *Lagos Traffic Radio + CCTV + e-ticketing* model reduced violation rates by 34% between 2021-2023 (Lagos State Government, 2023). Traffic lights improve intersection capacity by 20-40% when properly timed (FHWA, 2022). However, effectiveness depends on power supply, maintenance, and driver compliance.

Traffic Officers refer to human agents from FRSC, VIO, NSCDC, and Ekiti State Traffic Management Agency, EKSG-TMA, who enforce laws physically. Their roles include: stopping violations, educating road users, managing gridlock, and accident response (FRSC Act, 2007). Studies show visible police presence reduces speeding by 10-15% due to the deterrence effect. In Nigeria, *stop-and-search* and manual flag control remain dominant due to limited technology (Adebisi et al., 2024, Nagin, 2023)

The relationship between technology and human officers is complementary, not a replacement. Media Richness Theory (MRT) (Daft & Lengel, 1986), adapted to the traffic context, suggests that “rich” human interaction is needed for ambiguous situations like accidents, while “lean” automated systems handle routine flow control. Deterrence Theory Beccaria (DTB) (1764) also explains that the likelihood of being caught by either a camera or an officer reduces violation intention.

Despite investments, Ado-Ekiti faces mixed results. Since 2021, the Ekiti State Government has installed new traffic lights at 6 junctions and deployed FRSC “Zebra” patrol vehicles. Yet commuters report frequent blackouts disabling lights, vandalism of CCTV, and inconsistent officer presence (Ekiti State Ministry of Works, 2023). Commercial drivers complain of “double enforcement” where both technology and officers issue tickets for same offense, creating confusion (Ado-Ekiti Drivers Union, 2024).

Several Nigerian studies have examined traffic regulation, but most focus on Lagos, Abuja, or Port Harcourt (Adebisi et al., 2024; Ogunlana & Adeyemi, 2023). Limited empirical data exists for Ado-Ekiti, a medium-sized capital with unique challenges such as lower budget, fewer flyovers, and higher reliance on motorcycles. This gap makes policy planning difficult for Ekiti State Government. For instance, should limited funds go to more CCTV or to recruiting/training more officers? Furthermore, post-COVID changes in traffic patterns have not been studied in Ado-Ekiti. Increased e-commerce delivery bikes and ride-hailing cars have altered congestion points since 2022 (World Bank, 2024). Understanding how technology and officers affect regulation in this new context is urgent for Sustainable Development Goal 11.2: safe, affordable, accessible transport systems by 2030 (UN, 2023)

Therefore, this study assesses the effects of traffic control technology and traffic officers on road traffic regulation in Ado-Ekiti. Findings will guide the Ekiti State Government, FRSC, and EKSG-TMA on resource allocation and policy.

Statement of the Problem

Despite the installation of traffic lights and the deployment of FRSC/VIO officers, Ado-Ekiti still experiences gridlock, traffic violations, and crashes at major junctions. Three gaps exist: First, there is no empirical data on which is more effective between traffic control technology and traffic officers for Ado-Ekiti road users. Second, factors like power supply and officer training that moderate effectiveness have not been quantified locally. Third, Ekiti State’s 2023 Transport Policy requires evidence-based investment, but lacks local data to decide between buying more cameras or training more officers. Without this evidence, regulation efforts may remain inefficient and costly.

Purpose of the Study

The main purpose is to examine the effects of traffic control technology and traffic officers on road traffic regulation in Ado-Ekiti, Ekiti State. Specifically, the study will:

1. Assess road users’ perception of the effectiveness of traffic control technologies at major junctions in Ado-Ekiti.
2. Examine the effect of traffic officers’ presence and enforcement on compliance with traffic regulations.
3. Determine the combined effect of technology and traffic officers on traffic regulation.

Research Questions

One research question was raised to guide the study

1. How do road users in Ado-Ekiti perceive the effectiveness of different traffic control technologies in regulating traffic?

Research Hypotheses

Three research hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant difference in the perceived effectiveness of traffic regulation among road users at different junctions in Ado-Ekiti.
2. Traffic control technology has no significant effect on road traffic regulation in Ado-Ekiti.
3. Traffic officers' enforcement has no significant effect on road traffic regulation in Ado-Ekiti.

Research Method

This study implored descriptive survey design. The population of the study consisted of about 250,000 daily road users, including motorists, commercial drivers, okada riders, and commuters in Ado-Ekiti metropolis (Ekiti State Bureau of Statistics, 2024). The sample for this study consists of 400 respondents using the Krejcie & Morgan table. A procedure was used to select the sample. In stage one, 5 major junctions were selected using a purposive sampling technique, such as Okeyinmi, Ijigbo, Ajilosun, Basiri and Adebayo. In stage two, 80 respondents were selected per junction using systematic sampling of every 5th road user during peak hours 7-9am, 4-6pm. The instrument used for this study was a self-developed instrument tagged "Traffic Regulation Effectiveness Questionnaire TREQ". Section A: demographics. Section B: 4-point Likert SA=4 to SD=1 on effectiveness of technology and officers. Face and content validity of the instrument were ensured by experts in Educational Technology and three transport experts. The reliability of the instrument was ascertained. Reliability coefficient of 0.87 via pilot test with 40 respondents at Ikere junction. was obtained which was considered high enough to be used. The researcher administered the instrument with the help of six trained research assistants. All the questionnaires administered were retrieved from the respondents immediately. Descriptive and inferential statistics were used to analyse the data collected in the study. Descriptive statistics, such as Mean and standard deviation, were used to answer the research question raised, while inferential statistics of Analysis of Variance and Multiple Regression were used to test the hypotheses. The hypotheses were tested at 0.05 level of significance.

Results

Research Question: How do road users in Ado-Ekiti perceive the effectiveness of different traffic control technologies in regulating traffic?

Table 1: Showing the Mean and SD of perceived Effectiveness of Traffic Control Technologies in regulating traffic in Ado-Ekiti

Technology	Mean	SD	Decision	Rank
Traffic Lights/Signals	3.52	0.61	Effective	1
Road Markings/Zebra Crossings	3.41	0.58	Effective	2
CCTV Surveillance Cameras	3.18	0.74	Effective	3
Speed Cameras/Radar	2.96	0.81	Effective	4
Variable Message Boards VMS	2.71	0.83	Effective	5
Grand Mean Score	3.16			

Mean cutoff = 2.50

Table 1 above showed that Traffic lights ranked highest, aligning with FHWA 2022 that signals increase intersection efficiency by 20-40%. Low rating of VMS may be due to poor power supply, causing frequent blackouts. The mean cutoff score of 2.50 is less than the grand mean score of 3.16, this implies that there is perceived effectiveness of Traffic Control Technologies in regulating traffic in Ado-Ekiti. All technologies rated effective, but traffic lights highest

Testing Hypotheses

Research Hypothesis 1: There is no significant difference in perceived effectiveness of traffic regulation among road users at different junctions in Ado-Ekiti

Table 2: Showing Analysis of Variance of perceived effectiveness of traffic regulation among road users at different junctions in Ado-Ekiti

Junction	N	Mean	SD	F	Sig p	Decision
Okeyinmi	80	3.31	0.42	3.67	0.006	Rejected
Ijigbo	80	3.18	0.45			
Ajilosun	80	3.05	0.51			
Basiri	80	2.97	0.48			
Adebayo	80	2.89	0.53			

Table 2 shows that a significant difference exists, $F(4, 395) = 3.67$, $p = 0.006$. Okeyinmi scored the highest due to the functional traffic light and constant FRSC presence. Adebayo scored lowest due to frequent power outages and fewer officers. The hypothesis raised is therefore rejected; this implies that there is a significant difference in perceived effectiveness of traffic regulation among road users at different junctions in Ado-Ekiti.

Research Hypothesis 2: Traffic Control Technology has no significant effect on Road Traffic Regulation in Ado-Ekiti.

Table 3: Showing Multiple Regression Traffic Control Technology has no significant effect on Road Traffic Regulation in Ado-Ekiti.

Variable	B	Std Error	β	t	Sig p
Constant	0.892	0.211	-	4.23	0.000
Traffic Control Technology	0.408	0.052	0.41	7.85	0.000

$R = 0.695$, $R^2 = 0.482$, Adjusted $R^2 = 0.479$, $F(2, 397) = 185.4$, $p < 0.005$

Table 3 showed that Technology $\beta = 0.41$ significantly predict regulation, explaining 48.2% variance. The hypothesis raised is therefore rejected, which implies that Traffic Technology Control has a significant effect on road traffic regulations. Thus, Traffic Control Technology will influence compliance to traffic regulations among road users in Ado-Ekiti.

Research Hypothesis 3: Traffic officers' enforcement has no significant effect on road traffic regulation in Ado-Ekiti.

Table 4 showing Multiple Regression Traffic Officers' Enforcement has no significant effect on Road Traffic Regulation in Ado-Ekiti.

Variable	B	Std Error	β	t	Sig p
Constant	0.892	0.211	-	4.23	0.000
Traffic Officers Enforcement	0.335	0.048	0.33	6.98	0.000

$R = 0.695$, $R^2 = 0.482$, Adjusted $R^2 = 0.479$, $F(2, 397) = 185.4$, $p < 0.005$

Table 4 showed that Traffic Officers $\beta = 0.33$ significantly predict regulation, explaining 48.2% variance. The hypothesis raised is therefore rejected; this implies that has a significant effect on Road Traffic Regulation in Ado-Ekiti. Traffic Officers' presence and enforcement actions will influence compliance with traffic regulations among road users in Ado-Ekiti.

Discussion

The findings of the study revealed that there is perceived effectiveness of Traffic Control Technologies in regulating traffic in Ado-Ekiti. This confirms the Ekiti State Ministry of Works 2023 report that CCTV rating is moderate due to vandalism concerns raised by respondents. The findings showed that Traffic Technology Control, Traffic Officers' presence and enforcement actions will influence compliance with traffic regulations among road users in Ado-Ekiti. This supports the complementary role theory that cameras deter violations 24/7 while officers handle exceptions. Similar to the Lagos model, where e-ticketing and FRSC patrol reduced crashes (Lagos State Govt, 2023, Nagin, 2023). The findings further revealed that there is a significant difference in the perceived effectiveness of traffic regulation among road users at different junctions in Ado-Ekiti. This shows that infrastructure and personnel density matter

Conclusion

Traffic control technology and traffic officers significantly affect road traffic regulation in Ado-Ekiti. Traffic lights and road markings are the most effective technologies, while visible officer presence strongly deters violations. However, power supply, maintenance, and training limit effectiveness. Neither technology nor officers alone can solve regulation problems - an integrated approach is required. Ado-Ekiti's traffic situation will improve only if technology is sustained and officers are well-trained and adequately deployed.

Recommendations

1. The Ekiti State Government should convert all traffic lights to solar power to solve the outage problem. Also, there should be a quarterly budget for the maintenance of CCTV and signals
2. FRSC/VIO/EKSG-TMA should organize training for traffic officers on the use of speed cameras and digital ticketing. Also, there should be increase number of traffic officer deployment during peak hours at Adebayo and Basiri junctions.
3. FRSC should run monthly public enlightenment programmes through radio jingles on Road Safety Rules in Yoruba and Pidgin to improve compliance culture
4. Ekiti State Government should develop an Intelligent Traffic Management System linking CCTV, traffic lights, and a control room, like the Lagos model

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