

THE EFFECTIVENESS OF ATCS USE POLICY IN IMPROVING TRAFFIC SMOOTHNESS AND SAFETY IN BANJARBARU CITY

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Abstract

Researchers are interested in conducting research on the effectiveness of ATCS use policies in improving the smoothness and safety of traffic in Banjarbaru City, because ATCS is a policy implemented by the Banjarbaru City government to reduce the level of congestion and also a form of public service in the traffic sector. This research was conducted with the aim of evaluating the effectiveness of ATCS use policies in overcoming traffic problems in Banjarbaru City. The research uses qualitative research methods using interviews, observation and documentation to collect problem data based on facts. The research results show that the implementation of ATCS in Banjarbaru City has shown positive results in reducing congestion. With the ability to manage traffic dynamically, this system can adjust the timing of green and red lights based on the volume of passing vehicles. This is very important, especially during rush hour, where traffic tends to be heavy.

Keywords: Effectiveness, Traffic, ATCS.

INTRODUCTION

The government has a very crucial role in improving public services in the field of traffic, especially in terms of smoothness, order, and safety (Djahel, Doolan, Muntean, & Murphy, 2014). This is in line with the goal of creating a comfortable and safe driving environment for all road users. Along with the advancement of science and technology, traffic and highway transportation have undergone many changes that have an impact on changing people's behavior (Hancock, Ockleford, & Windridge, 1998).

Based on Law Number 8 of 2022 concerning South Kalimantan Province in Article 4, it is stated that the city of Banjarbaru is the capital of South Kalimantan Province (Dewi & Ayuningtyas, 2023). So with that, the city of Banjarbaru is increasingly developing and showing its increasingly thick urban characteristics. The city of Banjarbaru, which has just been designated as the capital of South Kalimantan Province, has an important role as an administrative, economic, educational, and cultural center.

Population development is also increasing, this can be seen from BPS data from Banjarbaru City in 2024 with a population of 273.47 per thousand people, which the previous year was only 268.11 per thousand people. However, when mobility and the growth of the population and vehicles continue to increase faster than the development of road infrastructure, traffic problems begin to arise. Traffic is a means of mobility of urban communities from one place to another, which if the traffic flow is disrupted or congestion occurs, of course the mobility of the community will also be disrupted (Herdiansyah & Atika, 2016). Based on data from the Banjarbaru City BPS in 2023 taken from new registrations and re-registrations at the Banjarbaru UPPD, there are 134,053 vehicles that are two-wheeled, three-wheeled, and four-wheeled. This is an increase from the previous year which was only 133,801 vehicles. With the large number of

vehicles registered in the city of Banjarbaru, it certainly has a direct effect on the traffic flow and causes the performance of the roads in the city of Banjarbaru to decrease (Kurniawan & Marhaeni, 2023). Congestion occurs due to the large number of vehicles that are not adjusted to the number of road sections, and many traffic violations can occur if the government does not provide adequate supervision.

Based on data from field surveys, the level of congestion often occurs at certain times during morning and evening rush hours. On the Jl. Panglima Batur section, there is often a build-up of vehicles on the *u-turn* in front of the Banjarbaru Samsat Office and *the u-turn* in front of the Post Office which causes congestion and accidents. Meanwhile, on Jl. A. Yani, the accumulation of vehicles often occurs in the *u-turn* in front of the Subdenpom or BRI Banjarbaru Office and *the u-turn* in front of the North Banjarbaru Police Station. Based on the results of TC and CTMC, there are 400 vehicles that make a U-turn every 15 minutes and 1,800 vehicles that pass on the Jl. A. Yani section every 15 minutes.

Traffic is a means of mobility for urban people from one place to another, if the traffic flow is disrupted or there is congestion, of course, people's mobility will also be disrupted (Giles-Corti, Zapata-Diomedes, Jafari, Both, & Gunn, 2020). These problems include not only congestion, but also high delays, increased queues, and increased risk of accidents. Ignoring traffic regulations can also result in accidents, where many road users often violate the law and need to be dealt with seriously because the losses suffered by those involved in traffic accidents will increase every year if this problem is not dealt with thoroughly. Based on data from the Banjarbaru City BPS in 2023, the number of accidents in Banjarbaru City is 109 reported and 106 resolved (Wolff, 2023).

To reduce the level of congestion and also the form of public services in the field of traffic, the Banjarbaru City government has issued various policies, in accordance with the Banjarbaru City Regional Regulation Number 14 of 2016 concerning the Implementation of Transportation in the City of Banjarbaru, namely the policy of using a traffic control system or *Area Traffic Control System (ATCS)* at several intersections. This ATCS development policy is also based on the results of the Transportation Field Study of Average Daily Traffic Data (LHR) and the ATCS Location Determination Plan in Banjarbaru City in 2022, as well as the Study of Road Geometric Design and *U-Turn Arrangement of Banjarbaru City in 2024*. In the implementation related to national roads, before the construction process is carried out, recommendations and permits have been obtained from the Ministry of Transportation, the Directorate General of Land Transportation, the South Kalimantan Class II Land Transportation Management Center (BPTD) and the Ministry of Public Works and Public Housing, the Directorate General of Highways, the South Kalimantan National Road Implementation Center.

A policy is present as a solution to problems that exist in society. The Banjarbaru City Transportation Office acts as a policy implementer through the Division in charge of managing the program. One of the innovations carried out by the Banjarbaru City Transportation Office is by implementing a traffic intelligence system using ATCS technology.

Area Traffic Control System (ATCS) is a system that uses information technology to manage and regulate traffic in an area. The system works by coordinating and optimizing the arrangement of traffic lights at various intersections. ATCS technology has been widely applied in various major cities in developed countries. To collect traffic data in *real-time* and control the traffic signal cycle, ATCS uses CCTV cameras to connect traffic at intersections. When an accident or traffic disruption occurs, officers can use

data from CCTV cameras and sensors to detect the incident faster. It is also possible to change the cycle time of traffic lights at intersections several times a day to accommodate local traffic needs. If there is a traffic jam, the system will extend the green time or reduce the red time on congested lanes. The traffic rhythm will be more regular if the city government installs ATCS technology at every traffic intersection within the city.

ATCS is the right solution in overcoming various traffic problems in the city of Banjarbaru. Reflecting on other cities such as Jakarta City which has a huge congestion problem, to overcome it, the local government implements ATCS in several strategic areas covering many main intersections, one of which is on Jl. Sudirman-Thamrin. Then the city of Surabaya, the city of Bandung, the city of Makassar, the city of Yogyakarta, the city of Malang, the city of Medan, the city of Palembang, the city of Semarang, the city of Palangka Raya, the city of Denpasar, the city of Banjarmasin and many other cities and districts that use ATCS. The implementation of ATCS in cities in Indonesia shows the efforts of local governments to reduce congestion and improve traffic efficiency. Several countries also use the ATCS system, one of which is Singapore. ATCS in Singapore has developed very well, and one of the most well-known implementations is *Electronic Road Pricing (ERP)*, which is an automated toll collection system that also serves as a traffic volume control tool. Then Los Angeles, which is a city with very heavy traffic. Los Angeles adopted *Sydney Coordinated Adaptive Traffic System (SCATS)* technology which was originally developed in Sydney, Australia. SCATS is a system that allows traffic lights to adapt to traffic changes in *real-time*. ATCS can be an effective solution because it is a high-tech device equipped with camera components, sensors, and software. With frequent problems such as congestion and accidents, ATCS is able to detect changes in traffic flow conditions in *real-time*, such as detecting an increase in vehicle volume and then the system will automatically adjust the green light cycle time to optimize traffic flow. By dynamically setting the time of the lights, ATCS can minimize vehicle waiting time thereby improving travel efficiency.

ATCS has advantages compared to other traffic management systems (conventional ALPL), namely:

	ATCS	CONVENTIONAL APILL
HOW IT WORKS	Using sensors and software to monitor traffic in <i>real-time</i> and automatically create traffic engineering	Use a preset timer to set the red, yellow, and green light time cycles
FLEXIBILITY	Flexible, can adapt to traffic conditions such as current density, time, and weather	Rigid, difficult to adjust to <i>real-time traffic conditions</i>
EFFICIENCY	More efficient as it can minimize vehicle waiting time by optimizing traffic flow	Less efficient because it can't optimize streams in <i>real-time</i>
CONGESTION	Helps dynamically decompose traffic flow	Prone to causing congestion, especially in the event of unexpected traffic conditions
SALVATION	Improve safety by prioritizing congested lanes or traffic build-up	The level of safety depends on the lighting timing that has been set

TECHNOLOGY	Uses advanced technology such as sensors, cameras, and software	Using simple technology
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The policy of using ATCS is very suitable to be implemented in the city of Banjarbaru, especially after it was designated as the capital of South Kalimantan Province. This has a significant impact with the relocation of the government center accompanied by community mobility and the growth of vehicles that continue to increase faster, causing traffic congestion. Therefore, a dynamic and efficient traffic arrangement is needed. Although it provides many benefits in overcoming congestion and improving traffic efficiency, it also faces a number of shortcomings and challenges. The following are some of the challenges faced in the implementation of ATCS in Indonesia, namely:

1. High cost: The construction and maintenance of ATCS systems requires considerable costs.
2. Limited technological infrastructure: Internet network infrastructure and data connections in some regions in Indonesia are still limited. In remote areas or outside large cities, ATCS systems that rely on *real-time* data transmission make it possible to face difficulties in communication between sensors, cameras, and traffic control centers. An unstable internet connection can cause delays in critical decision-making.
3. Reliance on technology: In the event of a malfunction or failure of the system, such as a hardware or software glitch, it can lead to serious problems such as severe congestion or traffic accidents.
4. Limited human resources: The implementation of ATCS requires a skilled workforce in managing and maintaining the system. However, in some regions in Indonesia, there is still a limited number of experts who have skills in this field, both in terms of system programming, hardware maintenance, and traffic data management. Without adequate training, the chances of operational errors or system failures can increase.
5. Lack of coordination between agencies: The management of ATCS requires good coordination between various parties, such as the Transportation Service, the Police, and other related agencies. This lack of coordination between institutions can lead to inappropriate decision-making or even hinder the implementation of the ATCS system in the field.
6. Changes in road user behavior: Changes in road user behavior require intensive time and socialization. Motorists are also often unfamiliar with dynamically changing traffic arrangements. If ATCS changes the duration of a green or red light quickly, riders may feel confused and frustrated, potentially leading to accidents or more aggressive driving behavior.

While ATCS has great potential to improve traffic management and reduce congestion in Indonesia, the challenges cannot be ignored. If these challenges can be overcome, then the implementation of ATCS will be more effective in overcoming congestion in Indonesia. The implementation of ATCS in various cities in Indonesia shows serious efforts to overcome congestion problems and improve transportation quality.

This study aims to evaluate the effectiveness of the policy of using ATCS in overcoming traffic problems in the city of Banjarbaru. By clarifying the understanding of the important concepts used in this study, the focus of this research is the effectiveness of the policy of using ATCS in the city of Banjarbaru. According to Makmur (2011:6) that

"Effectiveness can be said to be the accuracy of expectations, implementation and results achieved". Meanwhile, according to Pasolong (2008:4) said "Effectiveness means that the goals that have been planned in advance can be achieved or in other words the goals are achieved because of the activity process".

RESEARCH METHOD

This study uses qualitative research methods using interviews, observations, and documentation to collect data on problems based on facts. Then present, develop, and use known theories to carry out the results of interviews, observations, and documentation collected to get a field overview and assess the effectiveness of ATCS use policies in improving traffic smoothness and safety in the city of Banjarbaru. According to Travel in Sevilla (1993:71) the main purpose of using this method is "to describe the nature of a state that is temporarily running at the time the study is conducted, and to examine the causes of a particular symptom"

RESULTS AND DISCUSSION

1. The Implementation of ATCS and Its Impact on Traffic
 - a. ATCS is a system designed to manage and regulate traffic more efficiently by utilizing information technology. In Banjarbaru City, the implementation of ATCS has shown positive results in reducing congestion. With the ability to dynamically adjust traffic lights, the system can adjust the time of the green and red lights based on the volume of passing vehicles. This is very important, especially during peak hours, where traffic flows tend to be congested.
 - b. Data obtained from the survey showed that the waiting time of vehicles at intersections was significantly reduced after the implementation of ATCS. This not only improves the smooth flow of traffic but also reduces stress for drivers and improves safety on the road.
2. Traffic Data Analysis
 - a. The results of field surveys show that ATCS is able to reduce the number of accidents that occur at intersections equipped with this system. With better arrangements, the risk of accidents due to traffic jams and traffic violations can be minimized. For example, at some critical points such as *u-turns* in front of Samsat and Police offices, the accumulation of vehicles that often occurs can be overcome with more efficient traffic light arrangements.
 - b. In addition, ATCS also allows for the collection of traffic data in *real-time*, which can be used for further analysis and better transportation planning in the future.
3. Challenges in ATCS Implementation:

Although ATCS provides many benefits, there are also several challenges faced, including:

 - a. High Cost: The construction and maintenance of ATCS systems requires significant investments.
 - b. Infrastructure Limitations: Some regions still have inadequate technological infrastructure, which can hinder system operations.
 - c. Dependence on Technology: Malfunctions in the system can cause serious problems in traffic management.
 - d. Human Resources: Limited skilled workforce in managing and maintaining ATCS systems.

- e. Lack of Coordination: Poor coordination between relevant agencies can hinder implementation and decision-making.
- f. Changes in Road User Behavior: Road users may not be familiar with dynamic traffic arrangements, which can lead to confusion.

CONCLUSION

The policy of using ATCS in the city of Banjarbaru is the right strategic step to overcome increasingly complex traffic problems. With the implementation of this system, it is hoped that it can improve traffic smoothness and safety, as well as provide benefits for people's mobility. However, the challenges that exist need to be overcome through several steps, such as:

1. Training for the workforce to improve skills in system management.
2. Improvement of technology infrastructure to support ATCS operations.
3. Socialization to the public about the benefits and how ATCS works to change the behavior of road users.

With the right strategy and cooperation between agencies, the effectiveness of this policy can be increased, so that it can have a greater positive impact on the community in terms of traffic safety and efficiency in the city of Banjarbaru

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