Proceedings of the 2nd ITB Graduate School Conference ISSN: 2963-718X
Strengthening Multidisciplinary Research to Enhance its Impact on Society
July 21, 2021

Analysis of Control Management to the Public Transport Drivers Using Global Positioning System (GPS)

Muhammad Arief Munadi, Meldasari Said* & Zainal Arifin

Magister Management, Sekolah Tinggi Ilmu Ekonomi Indonesia Banjarmasin 70123, South Kalimantan, Indonesia
*Email: meldasaid75@gmail.com

Abstract. This study aims to analyze the behavior of Public transport drivers from the perspective of driving data using a vehicle tracker connected to Global Positioning System (GPS). Prior to the installation of a GPS device, it was found in the field that there were often misuse of public transport by drivers. This study used a qualitative or naturalistic approach, with purposive sampling as the technique to gather sample, the drivers of Tabalong Regency City Transportation Service, Indonesia. Observation to the drivers behavior thru GPS and in depth interview with the officers were used as data collection techniques. With the installation of this GPS application, there is a decreasing trend in the number of misconducting perpetrators of public transport in the period 2018 to 2020, namely before and after the installation of GPS control devices on the public trasnport units. This decrease in number proves that there is a positive effect on improved performance of public transport drivers after the installation of GPS. Analysis of public transportation management control through the use of GPS is expected to provide maximum city transportation services to meet the needs of land transportation in the city for the community by preparing quality resources, both from reliable human resources and modern technology resources.

Keywords *control management system, GPS, transportation.*

1 Introduction

Quality is an essential aspect of public transport. In the case of regular public passenger transport by road, punctuality and regularity are criteria used to assess quality of service by Padron *et al*. in [1]. Since transportation is a complex system, there are many factors involved in transportation activities, there are (1) passenger factors, (2) driver factors, (3) economic factors, (4) safety factors, and (5) environmental factors by Gui and Wu in [2]. Grengs *et al*. in [3] stated that conventional travel surveys have several serious limitations for travel behavior research. First, the self-reporting of data is known to be unreliable. People typically underreport short trips, and underestimate trip durations and misrepresent the time that a trip starts and ends. Trip destination locations are reported inconsistently, such as listing the nearest main intersection when a street

address is unknown. A second disadvantage is that self-reported surveys are collected over very short time periods, typically over two days. Third, these self-reported surveys fail to capture important spatial information about trips because they collect data on individual trips by aggregating them to traffic analysis zones (TAZs) for analysis and modeling. Furthermore, this method of limiting data collection to trip end locations leaves no information about travel behavior between origin and destination, so that the actual route traveled between TAZs is unknown. Transportation planners must resort to such methods as route choice modeling or shortest path networks to ascertain the route between TAZs.
GPS-based data are becoming a cornerstone for real-time transportation applications by Zhao *et al.* in [4]. Data collecting through GPS tracking is considered to overcome the shortcomings of conventional travel surveys. Because GPS data do not rely on the memory, estimations, and diligence of a person's self-reporting, they also provide precise locations and times. Two main types of GPS receivers used in urban transport vehicles measurements can be distinguished; (1) stationary receivers, built-in vehicle receivers, working without the need for an observer to interfere, being a part of vehicle equipment – useful for current, permanent registration of urban public transport system, particularly for schedule optimization; and (2) manual receivers, manned by measurers who additionally take measurements of vehicle occupancy; particularly important in corridor research and for individual lines, mostly useful in case of searching the reasons of disturbances on the public transport lines or corridors by Bauer in [5].

Tanjung is the capital of Tabalong Regency, South Kalimantan, Indonesia, which has a high traffic and community, which resulted in dense vehicle traffic. This condition is also coupled with the existence of bus transportation facilities for coal company employees which operates daily, so the implementation of Public transport, which are currently managed by the Tabalong Regency Transportation Service, can help reduce traffic density in Tabalong Regency. This is in line with Primatama's research in [6] that public transport should be integrated into one authority board to minimize conflict and creating an effective and efficient network of transport. Changes in transportation modes and their arrangements must be supported by public transportation conditions that can match the comfort of private vehicles by Minea & Dumitescu in [7].

Structuring the transportation system and urban transportation services is an integrated manner and an inseparable unit. Optimal service is the key in everything. Good service and driver's attitude are outputs that are an important part of this service, with expectations to provide transportation services based on the demand. Demand management is another way to better serve customers. Traditionally, travel demand management (TDM) has focused on road congestion; however, with more public transport agencies facing crowding problems, there is an increasing need to develop more structured conceptual and

methodological approaches for public transport TDM by Halvorsen *et al.* in [8]. However, before good service is realized as the output, resources that have a competitive advantage are needed to develop and implement a Management Control System from the Tabalong Regency Transportation Service to regulate performance, so that it is more optimal than the drivers whose main task is as the driver of this City Transport Car.

In order to actualize this output, the Tabalong Regency Transportation Service has equipped a software device in the form of a Vehicle Tracker tool that is connected to the Global Positioning System (GPS) as part of the existing resources in the Management Control System to supervise the performance of drivers. A mobile app that provides information on public transport in a city could be extremely useful too for people who live in that city and for those who live outside the city by Lupasc [9].

The Indonesian government, through the Ministry of Transportation since 2019 has required public transportation of people with motorized vehicles to install an electronic vehicle movement monitoring device or Global Positioning System (GPS). Technical instructions regarding the obligation to install GPS have been regulated in the Regulation of the Director General of Land Transportation Number: KP.2081/2019, containing some information in the GPS such as real-time vehicle monitoring via google map, speed information (odo meter) address location, and google view street, information on the origin and destination of the vehicle, the route of each vehicle, the duration of the trip for each vehicle, able to provide speed limit warnings, data asset management and drivers, record travel data for at least 7 working days and so on by Yuniartha & Laoli in [10] . The enforcement of this regulation is given for one year, after which, public motorized vehicles that do not have GPS will be penalized or their licenses will not be extended. The policy of installing electronic vehicle monitoring devices is aimed at making supervision of public transportation easier to carry out.

The efficiency of a transport system depends on several elements, such as available technology, governmental policies, the planning process, and control strategies by Ibarra-Rojas *et al*. [11]. Indeed, the interaction between these elements is quite complex, leading to intractable decision making problems. Suadi in [12] argues that Control Management are efforts to ensure that company resources are used effectively and efficiently to achieve company goals. Control Management System is a system consisting of several related subsidiary systems, namely: programming, budgeting, accounting, reporting and accountability to help management influence other people in a company to achieve company goals through certain strategies effectively and efficiently. The same thing is also expressed by Anthony in [13], in which he stated that Control Management System is a process to ensure that resources are obtained and used efficiently and

effectively to achieve organizational goals. On the other hand, the current perspectives of Control Management System attempt to address the behavioral issues within and outside organizational operations by Hared *et al.* in [14].

In its relevance to this study, it is concluded that the Control Management System is a system (activities, actions, programs, regulations, SOPs) that is carried out to use the available resources (GPS and City Transport Cars) to regulate other resources (Car Drivers and City Transportation) so that the company's goals (optimal driver performance for City Transportation Car services) can be achieved. Vehicle movement trajectory recorded by GPS maps the vehicle's lane position in time sequence, therefore theoretically can be used to assess driving behavior by Sun *et al*. in [15]. Although stable in the short term, individual travel behavior generally tends to change over the long term by Lou & Cheng in [16]. To provide sufficient parameters for driving behavior assessments, Sun *et al*. in [17] depicts the requirement of GPS data for each category, there are Lane Maintenance, Traffic Sign Compliance, Speed Regulation, Driving Maneuvers, Navigation and Wayfinding. For example, when turning, it is important to make the turn as accurate as possible, wide turns or cutting a turn too sharply are considered to be inappropriate behaviors. Thus, an accurate vehicle trajectory with precise curvature is required in order to evaluate the quality of turning behavior. GPS derived vehicle movement trajectory provides possibilities to quantitatively assess such on-road driving behavior.

One of the resources available at the Tabalong Regency Transportation Service are Drivers. Currently, the number of drivers who work as city transport car drivers are 38 people. However, prior to the installation of a GPS device, it was found in the field that there was often misuse of public transport by drivers. Whereas in the Standards of Ethics and Work Procedure (SETK) there are several regulations that emphasize warnings and prohibitions that must be obeyed by City Transport Car Drivers, including regulations regarding maximum speed, parking duration and the suitability of the route traversed. And all these regulations can be supported by monitoring the GPS-based Vehicle Tracker.

Problems arise when the waiting period was felt too long for the passengers. It could be the result of cars passing through the wrong route lane, or the possibility that the car is parked and stuck in one place for too long. In fact, the quality of public transportation services is judged by the short waiting time for passengers by Liu *et al.* in [18]. Thus, the Tabalong Regency Transportation Service considers this as a problem, and if left it will have an impact on the performance and productivity of the City Transport Car service itself.

These misconducts are the root of the problem which leads to the low performance of the City Transport Car Driver. The misconducts are visible

through the lengthy duration of driving (20 minutes), route breach and exceed maximum speed limit (over 60 km/hour). The Supervisory Officers were not able to monitor all of the city transportation car's activities due to the unavailable system that records the misuse of the city transportation car. Therefore, the Tabalong Regency Transportation Service installed a GPS-based vehicle tracker, which is also another resource added as a tool in the Management Control System to regulate the performance of drivers for the use of the City Transport Car. However, in general, the literature review shows that only very few examples can be found of using real-time information about drivers and passengers in disturbance management, which indicates that this application area is underutilized by Jevinger & Persson in [19]. For this reason, this paper describes the use of GPS for public transportation in the city of Tanjung by paying attention to the behavior of the drivers.

2 Methodology

Yuniar *et al*. in [20] stated in her study that a GPS-based vehicle tracker tool installed on a truck car unit aims to avoid truck loss and travel time waste to achieve a reduced fuel waste. GPS installation on trucks also assist operators and field supervisors to track trucks, provide warnings to drivers, monitor truck locations, provide information, and mark the speed of each truck. Field supervisors can immediately warn drivers who made an extended stop and helps them to point out the exact location where damages occur to trucks in order to deal with it efficiently. This study uses the same theoretical framework in analyzing public transport driver's behavior, as shown in the Figure 1.

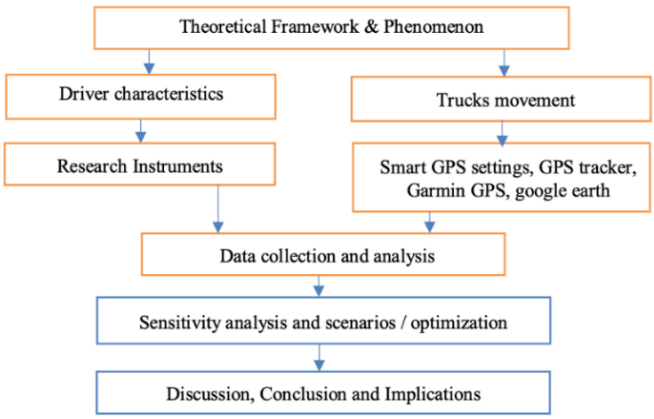


Figure 1 Theoretical Framework in Analysing Truck Driver's Behaviour (Yuniar et al. 2020).

This study used a qualitative or naturalistic approach. A qualitative approach is defined as a research approach in describing phenomena based on the viewpoints of informants, finding various realities and developing a holistic understanding of a phenomenon in a particular context by Hilal and Alabri in [21]. In line with this opinion, Almalki in [22] calls the qualitative method a method that is usually used in describing inductively, with assumptions based on the construction of social reality, variables that are difficult to measure, complex and interrelated, and the data collected contains the angle in-depth interview of the informant.

Research subjects are determined through purposive sampling technique. In accordance with the objectives of this study, research subject are focused on informants as source persons who work at the Tabalong Regency Transportation Service as shown in the following Table 1.

Table 1 Table 1: Resource persons at the Tabalong Regency Transportation Service.

No	Source Persons	Number of Source Persons
1.	Head of Department	1 person
2.	Head of Transportation and Multimoda	1 person
3.	Section Head of Insider Transport Route	1 person
4.	Driver	11 persons (out of 38 persons)
5.	Supervisor	4 persons (out of 10 persons)
6.	Admin	2 persons (out of 4 persons)

Data collection technique in this study was done through triangulation (combined) technique, in which the data analysis was inductive, and the results of qualitative research emphasized meaning rather than generalization. As shown in the Figure 2 and 3.

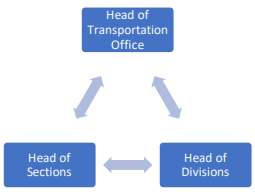
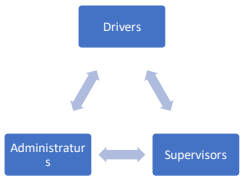


Figure 2 Data Source Triangulation



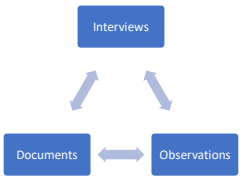


Figure 3 Triangulation of Data Collection Techniques

3 Results and Discussion

3.1 The Management Control System in the Transportation and Multimode Sector of the Tabalong Regency Transportation Service

The Tabalong Regency Transportation Service is a government agency under the Tabalong Regency Government, South Kalimantan Province. In accordance with the main tasks of its function, the Tabalong Regency Transportation Service is responsible for regulating public transportation in its area. In the Transportation and Multimode Sector, the Tabalong Regency Transportation Service, which directly supervises the Insider Transportation Section of the Route and the SOTK (Organizational Structure and Work Procedures) under it, of course has a separate management control system that regulates the operations of transporting people on the route, in this case the car.

City Transportation, where there are a number of human resources in it who are directly involved in this research such as Drivers, Supervisors and Admin staff, as well as technological resources which support the competitive advantage of the Tabalong Regency Transportation Service, namely the Vehicle Tracker tool that is connected to the Global Positioning System (GPS). GPS which is applied to twenty-five units of City Transport Car facilities as part of the existing resources in the management control system to monitor the performance of the driver for the use of the city transportation car so that services can be created. It is good for the community who use the City Transportation Car facility in Tabalong. As stated by Lupasc in [23] that a mobile app that provides information on public transport in a city could be extremely useful for people who live in that city and for those who live outside the city

The Head of the Tabalong Regency Transportation Service explained in the interview that to produce good driver performance, a management control system arrangement that specifically regulates the operation of City Transportation Car facilities is needed. From the legal aspect, starting from the recruitment process for human resources, which is regulated in the Tabalong Regent Regulation (*Perbup*) No. 25 of 2014 concerning Guidelines for Procurement of Contract Labor at the Tabalong Regency Transportation Service, and is stipulated by a decree from the Head of the Tabalong Regency Transportation Service every year. As for the operation of the City Transport Car itself, it is regulated in the Tabalong Regulation No. 24 of 2014 concerning the City Transport Route Network in Tabalong Regency, and Tabalong District Regulation No. 23 of 2014 concerning Minimum Service Standards for City Transportation in Tabalong Regency. By putting the arrangements of City Transport Cars to the Tabalong Regency Transportation Service is in line with Primatama's research in [24] that

stated, “Public transport should be integrated into one authority board to minimize conflict and creating an effective and efficient network of transport”.

The same thing was also stated and added by the Head of the Transportation and Multimoda Division of the Tabalong Regency Transportation Service that to emphasize the implementation of human resource operational activities within the SOTK (Organizational Structure and Work Procedures) in their respective fields, a Standard Operating Procedure (SOP) was drawn up which was approved by the Ministry of Education and Culture. The Head of the Tabalong Regency Transportation Service in the SOP Endorsement Sheet for the Implementation of City Transportation in Tabalong Regency No. B.590/2014 which consists of SOPs: City/Route Transportation; Maintenance, Monitoring and Repair of City Transportation Fleet; Handling of Crime and Emergencies in City Transportation; Handling of Crime and Emergency Situations in the Office Environment; Payment of Honorarium/Salary of Contract Workers; Receipt and Deposit; and Disciplinary Sentences.

In a separate interview, the Head of the Insider Transportation Section added that to be able to regulate the work procedures of human resources in the SOTK ranks below it, a Standard of Ethics and Work Procedure (SETK) was prepared which was also ratified by the Head of the Tabalong Regency Transportation Service in the Sheet. Ratification of the Special Contract Labor SETK for the Implementation of City Transportation No. B.591/2014 consisting of SETK: City Transport Drivers; City Transportation Supervisor; City Transport Technician; Security officer; and Administrative/Finance Officer; and a Transportation Evaluation and Development Team was also formed.

From the several regulations disclosed above, it shows the seriousness of the local government of Tabalong Regency in implementing a control management system to regulate the smooth operation of public transportation in this area. All aspects have been regulated, particularly related to human resource management, in addition to travel route arrangements, passenger safety and comfort, and vehicle maintenance. This comprehensive arrangement that has been implemented is in line with the control management practice framework starting from cultural control, administrative control, and process control by Giraud *et al*. in [25]. Cultural control is the explicit set of organizational definitions that senior managers communicate formally and reinforce systematically to provide basic values, purposes and direction for the organization. These cultural control elements are considered the key factors that shape the design and implementation of an organization operation generally, given in three activity levels; employees’ selection and recruitment, socialization process and the alignment of employees’ behavior to the organization’s objectives. Administrative control tasks refer to the organizational structure and governance system. Whereas process control is

an integrated group of activities that are employed to accomplish specific organizational goals, such as physical, people and material elements.

The existence of these regulations makes a strong legal basis in the supervision and control of public transportation operations. This is also a sign in determining the behavior of drivers and supervisors. This is in line with the thought of Anthony in [26], in which he stated that Control Management System is a process to ensure that resources are obtained and used efficiently and effectively to achieve organizational goals. On the other hand, the current perspectives of Control Management System attempt to address the behavioral issues within and outside organizational operations by Hared *et al.* in [27].

3.2 The Effect of Management Control on the Performance of City Transport Car Drivers

The current perspectives of Control Management System attempt to address the behavioral issues within and outside organizational operations by Hared *et al.* in [28]. In the City Transport Driver work procedure (SETK) No. SETK.PAK.001/2014 can be taken several points that are related to management control of driver performance, it regulates as follows; First, the city transport driver duties including transporting passengers according to the provisions that have been set, also pick up and drop off passengers at places on the route that has been determined. Secondly, the city transport driver functions are driving the city transport fleet properly and correctly, also protects and gives a secured feeling to the passengers. Third, the attitudes and behavior of city transport drivers must show discipline, polite, friendly, honest, fair, and wise. They must comply with state regulations and respect applicable norms in the work environment/area. Fourth, the city transport driver administrative work procedure must comply the arriving time at the workplace at least 15 (fifteen) minutes before the set working hours, as well as carry out internal coordination in harmony. Fifth, the city transport driver functional work procedure must serve the track according to the route permit given, also raise and lower passengers at predetermined places with a maximum time of 60 (sixty) seconds. And sixth there are Warnings and Don'ts procedures to the drivers that prohibit them to (i) carrying and consuming narcotics and liquor, carrying firearms and sharp weapons or other dangerous objects, (ii) conduct sexual harassment/violence, personal harassment, race, ethnicity, and religion, (iii) committing criminal acts in the form of extortion, fraud, gambling, and other evil acts that cause harm to oneself, others, and the environment, (iv) exceeding the highest speed limit for public transport, (v) exit from the route and lane that has been determined, and (vi) terminating the vehicle for reasons that cannot be justified. The contents of this regulation are in line with the context of research conducted by Sun *et al.* in [29], which includes categories of lane maintenance, traffic sign compliance, speed regulation, driving

maneuvers, as well as navigation and wayfinding. Each category is governed by three things, that is driving events, driving behaviors assessment variables, and GPS derived vehicle trajectory.

The SETK Driver above is supported by the work procedure (SETK) of City Transportation Supervisor/Timer No. SETK.PAK.002/2014 which also has several points related to management control of driver performance, that related to city transport supervisor/timer duties, they are recording the arrival time of city transportation at the control post according to the schedule, also recording the number of passengers. Related to the city transport supervisor/timer function, they must ensure that city transportation vehicles pass on the route specified according to the schedule and record the time and number of passengers. The Administrative Procedure regulates them to carry out internal coordination in harmony, and reporting incidents/events that occur while carrying out tasks. As an addition, the Functional Work Procedure regulate them to stand by at the designated transport trajectory control post, record the arrival time of transportation at the designated control post in the same route, and recapitulate records of time and number of passengers. Regulations regarding supervision of driver behavior are part of the administrative and process control proposed by Hared *et al.* in [30]. Administrative control tasks refer to the organizational structure and governance system. It is the control tasks that involve the administrative matters such as the design of organizational structure, setting responsibilities and defining governance mechanisms, while process control is an integrated group of activities that are employed to accomplish specific organizational goals, such as physical, people and material elements.

Referring to the two interrelated work procedures above, the Head of the Tabalong Regency Transportation Service stated that these two work procedures have become the standard of work ethics for City Transport Car Drivers in carrying out their duties. Control of the driver's attitude affects the quality of service, and the regulation of supervision of the driver can also affect the accuracy in carrying out tasks, in the case of regular public passenger transport by road, safety, punctuality, comfort and regularity are criteria used to assess quality of service by Padron *et al*. in [31]. So, with these regulations, it can be said that the performance of City Transport Car Drivers has met expectations even though it needs to be improved and quickly adapt (with the applicable work procedures) so that it is able to adjust to the wishes in serving the community.

The same thing was also conveyed by the Head of the Transportation and Multimode Division of the Tabalong Regency Transportation Service that currently the performance of City Transport Car Drivers is quite good and of course in the Transportation and Multimode Sector itself, they are doing the continuous improvement to provide services even better for the community.

Unlike conventional travel diaries that provide no information between origins and destinations, GPS data offer insights into the traveler's choices and decisions while end route by Grengs *et al.* in [32]. This opinion is also said by the Head of the Insider Transportation Section for the Tabalong Regency Transportation Service Route, "At first the implementation of management control was only manual, namely using supervisors as timers in the field. This is considered less effective and efficient." The most important advantage of GPS data is that they allow us to address the dynamic properties of travel behavior by capturing detailed spatial, temporal, and attribute conditions throughout the full length of the traveling experience by Grengs *et al*. in [33]. From this explanation, it can be understood that before the GPS-based Vehicle Tracker was installed on the City Transport Car unit, the supervision was carried out manually by supervisory officers by going to the field. However, this method is considered less effective and less efficient and adds to the burden of office costs. It is impossible for unit monitoring to be carried out comprehensively, cannot be validated and not real time due to the limitations of officers and supervisory equipment.

Furthermore, it was conveyed by the Head of the Insider Route Transportation Section that with the SOP and SETK and supported by existing applications, the Tabalong Regency Transportation Service could minimize driver inconsistencies. Thus, the Tabalong Regency Transportation Service believes that the implementation of SOP and SETK as a formal basis for the implementation of a management control system and supported by the GPS application as part of the management control system, city transportation cars and can improving the performance of City Transportation Car Drivers.

3.3 The GPS Supervising the Performance of City Transport Car Drivers

The Vehicle Tracker GPS tool, which was later named the GPS-Based Unit Monitoring Application (*in Bahasa they abbreviate it as* PUBG), is not only able to track the position of the unit's presence but can also detect several activities carried out by the driver City Transport Car service organizations, and of course on the performance of the driver himself, such as the maximum speed, duration of parking and the suitability of the route traversed.

This PUBG application is installed on a PC device under the supervision of the Head of the Insider Transportation Section for the Tabalong Regency Transportation Service, which is managed by City Transport Admin officers with a protection system in the form of an Admin User ID and Password. This application can be monitored, both for each car unit or just randomly or as needed.

The Map menu in Figure 4 displays an image of a map of the area that is monitored for the operation of the City Transport Car, in this case the Tabalong Regency area. Map images can be seen by sighting Google Streets, Google Satellite, or Google Hybrid. The Objects menu in Figure 5 displays all twenty-five units of cars that have been installed with Vehicle Tracker GPS, both those that are actively operating and those that are just standing by.

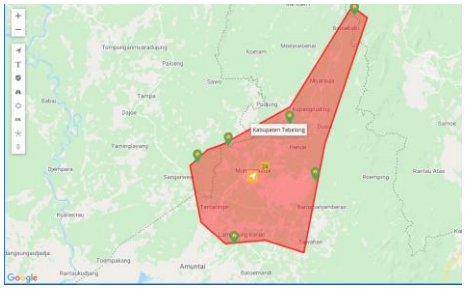


Figure 4 An Image of the Area that is Monitored

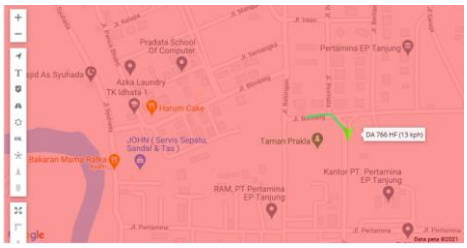


Figure 5 The Position of the Object that are Monitored

The unit object can be selected according to the needs of the Supervisor when carrying out supervision. The picture on the figure 6 above shows the monitoring of the position of the object of the DA 766 HF car unit which is operating on April 7, 2021, at 17:43 (GMT +8) (monitoring in real time). The Supervisor or Admin can monitor the existence/position of the desired unit in real time. On the screen also showed the coordinates of the unit and the car speed.

This Object menu is usually used when, for example, to track a unit that is experiencing technical problems such as a breakdown, tire leak, or delay in returning to the terminal, so that action or policy can be taken immediately.

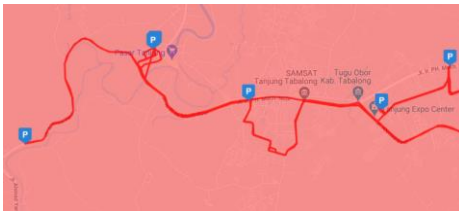


Figure 6 Speed Monitoring

Figure 7 The Stop and Overspeed Signs

Events menu which displays which units overspeed, above the specified speed, which is sixty kph. In the Gigure 6, were the events of unit 01A (unit identity withheld) which over speeded, namely speeds above 60 kph (kilometers per hour) on April 5, 2021. According to the Head of the Section for Insider Transportation, this overspeed incident is not always considered as an abuse of the unit, although the Insider Route Transportation Section still considers it a violation of the Driver's SETK. However, every overspeed incident like this is usually investigated first before the driver is sentenced to commit an abuse, especially until he is subject to warning letter sanctions and so on. If the reasons and the situation are understandable, then this kind of incident may be considered normal. Moreover, the overspeed incident on that day only occurred 1 (one) time, namely at 07:25 am (GMT +8). If the incident is investigated, it could be only because of the situation and conditional, not because of the behavior of the driver.

Another menu is History which displays the history of unit activity over a certain time, for example former day, this week, last week, even within this month or last month. Unit objects can be selected as desired and can view overspeed events and unit stop duration for 5 minutes, 10 minutes, 20 minutes, 30 minutes, 1 hour, 2 hours and 5 hours.

In the Figure 7 above, several dots marked with the letter "P" which means parking or stopping, and "E" which means event or overspeed incident. Supervisory officers or Admin can check what causes driver 01A to stop and overspeed. As explained above, it is not always the case that these incidents are considered as misuse of the unit. In the Driver's SETK, as mentioned in the previous point, activities such as: Exceeding the highest speed limit for public transportation; Exit from the designated route and lane; and terminating for reasons that cannot be accounted for is prohibited.

The Head of the Section for Insider Transportation for the Route confirmed that the maximum speed limit is sixty kph, and the long stop time limit is 20 minutes. But they still give tolerance the limit that can be considered reasonable according to the conditions in the field. The following is an example of an activity that should be included in the violation/abuse of the unit (terminating more than 20 minutes) but can still be tolerated because the situation and conditions are still acceptable to the Tabalong Regency Transportation Office, as shown on figure 8.

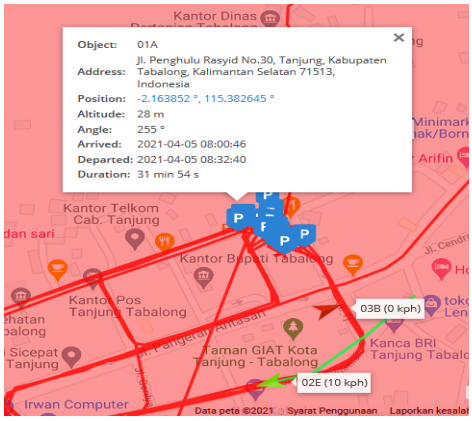


Figure 8 The Activity Sample of the 01A Car at 08.00 (GMT +8)

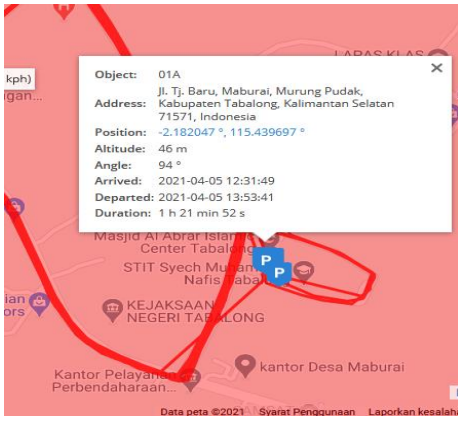


Figure 9 The Activity Sample of the 01A Car at 12.30 (GMT +8)

The appearance of the activity of the 01A car unit above occurred in the morning where the unit stopped for about 32 minutes. The location point is the Barunak Terminal (when the map is zoomed in, it can be seen that several units have gathered in the Barunak Terminal). It is believed that the driver is reporting to the supervisory team regarding the data on the number of passengers in the first batch departing from Mabuun Terminal to Barunak Terminal. Furthermore, unit 01A is still waiting for the next passenger to go to Pamarangan.

While waiting for the second batch of passengers, the driver could also take a breakfast break, because previously the unit had to be operating at 07.00 WITA departing from Mabuun Terminal, and the driver had to be present 15 minutes before the unit operated to check and prepare the car unit. So, the driver is believed to have enough time to do breakfast. Also, at Barunak Terminal, the driver can be available for breakfast. The habit of thinking about eating in the middle of work also occurred in research about taxi driver behavior in Haikou City, Japan by Gui & Wu in [34]. The transportation management in Haikou still adhered to the traditional system. The transportation utility values calculated by traditional utility methods are not comprehensive because traditional utility methods have been established within western economics, and their perspectives are limited to customers only by Gui & Wu in [35]. For instance, a passenger might arrive at their destination on time, but the taxi driver might not be able to eat dinner with his family. As a result, the passenger would benefit significantly from the trip, while the taxi driver would not. According to Gui & Wu in [36] to improve the utility of taxi drivers, we can analyze the willingness of taxi drivers by their real-time locations and compromise strictly with his work schedule, GPS surveillance becomes significant.

In the case of the driver having breakfast, he is still tolerated, if it is not done continuously or becomes a habit because it is done during service hours, so that it affects the performance of the driver himself, let alone affects the performance of other drivers. If it is done continuously and becomes a habit, it will receive warnings in stages starting from the Supervisory Team, Section Head to Head of Service in the form of Verbal Warning, 1st Warning Letter (SP), 2nd SP, to 3rd SP/Termination of Contract (firing).

The appearance of the activity of the 01A car unit in Figure 9 above occurred during the day where the unit stopped for about 1 hour 22 minutes. The location point is the Tabalong Al Abrar Islamic Center Mosque (when the map is zoomed in, it looks like several units are parked at the Mosque). It is believed that the driver was taking a break, praying, and having lunch. This condition may still be tolerated even though the provision is that the break is only 1 hour. If it is more than 1 hour, then it should gain a warning or sanction.

However, just like the previous conditions, this type of violation is still tolerated, of course, if it is not carried out continuously or becomes a habit, so that it can affect the performance of the driver himself, especially if it affects the performance of other drivers. Where between one driver and another, jealousy can occur if the Tabalong Regency Transportation Service does not take firm action and instead allows negligence or misuse of public transport to occur among the drivers.

By using GPS monitoring, supervisor can isolate: time of waiting for the possibility of taking a position at the stop, dwell time (also called as: alighting and boarding time), time of waiting for the possibility to departure, and travel time of a section between two following stops, It such an approach entitles to draw binding conclusions on operation of a line and enables to identify the causes of potential disorders by Bauer in [37].

Next is the event where unit 01A performs overspeed activity with a speed exceeding sixty kph. Just like parking activities (stopping), overspeed exceeding sixty kph is also not necessarily an abuse as long as there are reasons that can be justified and certainly not carried out continuously.

When confirmation is made to the Supervisory Team what causes the Driver to exceed the maximum speed, Supervisor 1 explains the possibility that the Driver exceeds the maximum speed simply because he wants to overtake other road users. But that does not mean the driver can do this all the time. Especially if it occurs on the main road route of the unit. All forms of violation still have consequences. "*If it is a minor mistake, it is enough to be personally reprimanded,*

but if it is a serious mistake, immediately report it to your superiors. Like repeating mistakes or fighting back when reprimanded."

Supervisor 2 also confirmed this that every form of abuse committed by the Driver must still have consequences, the Supervisor is obliged to give sanctions even though it is only in the form of a verbal warning and make notes as a report. The report is submitted to the admin for data verification. Then the Admin can ask why the abuse happened so that further action can be taken.

The following figure 10 is a picture of the appearance of the activity of unit 01A doing Overspeed during the period (History) from 05 to 09 April 2021.

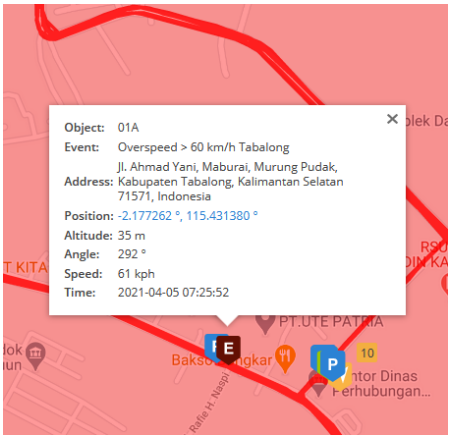


Figure 10 The Activity Sample of the 01A Car that Showed Overspeed

The appearance of the activity of the 01A car unit above occurred in the morning where the unit over speeded sixty-one kph. The location point is on Jalan Mabuun Raya (when the map is zoomed in, the unit can be seen traveling at a speed of sixty-one kph). It stated that the driver only wants to overtake other road users, this data can be seen during the period (05 to 09 April 2021) the driver only overspeed once. And for the Tabalong Regency Transportation Service, this condition cannot be explicitly stated as an abuse.

3.4 The Development of GPS Applications to Improve City Transport Car Services

The Head of the Section for Insider Transportation Route said that the PUBG application has undergone development in collaboration with the Tabalong Regency Communication and Information Office and the Tabalong Regency Statistics Agency. "*We are also developing the application within collaboration with Communication, Information and Statistics Office at Tabalong Regency*

under the name Langsat Manis which is not only useful for us as operators in watching the vehicles but can also be used by users to make it easier to get vehicle services. And the development of this application is included in the nomination for the Smart City project."

This application, which can be downloaded via the Play Store on an Android Smart Phone, is not only useful for the team of the Insider Transportation Section of the Tabalong Regency Transportation Service which acts as an operator in the supervision of City Transport Cars, but can also be used by users, namely passengers and the general public to make it easier to get information and city transportation services. Prospective passengers can make their choice, location of the pick-up point and estimated time to wait for the pick-up. A mobile app that provides information on public transport in a city could be extremely useful too for people who live in that city and for those who live outside the city by Lupasc in [38]. Furthermore, Lupasc in [39] states that the design and implementation of such an information system generates a number of advantages and benefits, the most important being: (1) fast access to information on public transport (stations and route map, route timetable) on any mobile device that has this application installed, without the need for an Internet connection; (2) the possibility of searching for the means of transport running between two stations or between two streets that the user inserts into the search module; and (3) the opportunity to run the app on both Android and iOS smartphone mobile devices.

The development of this application included in the nomination for the Tabalong project towards Smart City. This app uses the same principles as other online transportation apps. Through this application, prospective passengers can monitor where the position of the car unit is and how long the estimated time it will take to wait for the arrival of the car unit, and at the same time can make direct orders so that City Transport Car Drivers can find out that there will be prospective passengers on the route they will pass.

In the initial development of this application, there are six routes that can be accessed by prospective passengers to serve 3 (three) sub-districts in the central region, namely Murung Pudak, Tanjung and Tanta. And for the next there will be additions in the northern and southern regions.

The Head of the Transportation and Multimode Division explained that the existence of this application does not mean that the car unit only operates according to passenger orders, the unit continues to operate and continues to provide services as usual, it is just that prospective passengers cannot know for sure when the unit passes.

3.5 The Effect of GPS Control Devices on the Performance of City Transport Car Drivers

This GPS-based control device known as the PUBG Application has helped a lot in improving the driver's performance in providing services to the Tabalong community. This application has become a separate tool in management control for the Tabalong Regency Transportation Service. Drivers become more disciplined, honest, and motivated at work.

Both supervisors in the field and admins in the office have made it easier to supervise and record the activities of public transport, which total thirty-three units, even though only 25 GPS devices are installed. This application has also been able to cut the workload more easily, practically, and efficiently.

Supported by the expression of the Head of the Tabalong Regency Transportation Service that with the installation of this GPS control device, the performance of the drivers will be better, more efficient and can minimize the misuse of City Transport Cars, "Their performance will be better because with this application they can help a lot in handling transportation operations, are much more efficient, minimize violations and are right on target."

This is in line with research conducted by Zhao and Carling in [40] which observes the use of GPS through two aspects: geographic position of the vehicle and speed by tracking vehicles in a complex road network with varying transportation modes, environmental conditions and collection settings in real settings. The results of the research show that (1) the GPS tracking data identified the actual positions of the vehicles successfully, and (2) the tracked instantaneous speeds are quite accurate with a tendency of underestimation.
Regarding violations and abuse of Public transport, the Head of the Section for Insider Transportation added that every form of SETK violation is still called a violation even though the scale and impact are small or rarely carried out. The sanctions imposed can be in the form of a verbal warning, first warning letter (SP), 2nd SP, up to 3rd SP/Termination of Contract (firing). The following table 2 is a recapitulation of Admin data regarding the sanctions issued by the Tabalong Regency Transportation Service against drivers who violate and abuse Public transport in the period 2018 to 2020.

Table 2 Recapitulation of the Drivers' Sanction in the Period 2018-2020.

Warning Letter (WL)	Caused	2018 (Person(s))	2019 (Person(s))	2020 (Person(s))
WL 1	Absence without evidence	2	3	1
	Indiscipline (speed, out of line)	5	4	2
WL 2	Transit too long	2	2	1
	Absence without evidence	1	1	1
	Indiscipline (speed, out of line)	1	2	1
	Take passenger in fast lane	1	-	-
	Leaving at working hours	-	1	1
WL 3/ Fired	Absence without evidence	2	-	-
	Indiscipline (speed, out of line)	2	-	-

Note: 2018-2019 are the number of perpetrators before GPS installation. 2020 is the number of perpetrators after GPS installation.

From the recapitulation data at Table 2, it shows that there is a decreasing trend in the number of perpetrators of abusing Public transport in the period 2018 to 2020, namely before and after the installation of GPS control devices on the City Transportation Car unit. This decrease in the number of abusers at least proves the positive influence towards improving the performance of City Transport Car Drivers after GPS installation.

4 Conclusion

In line with the research conducted by Yuniar *et al* in [41]. which was written in the Journal of Truck Driver Behavior and Travel Time Effectiveness Using Smart GPS, that by installing a GPS device on a truck, apart from improving driver performance, driver safety, reducing ineffective time, saving fuel, saving operational costs, increasing vehicle usability, increasing driver productivity and customer service, it can also assist field supervisors in tracking the presence of trucks, provide warnings, monitor locations, provide information, and mark the speed of each truck. Even field supervisors will call drivers who have stopped for too long somewhere and can find out the location if there is damage to the truck so that it can be handled quickly.

Based on The Resource-Based View (RBV) theory used in this study describes that the basis of competitive advantage lies in a set of tangible or intangible assets (physical and non-physical resources) in an organization, company, or government agency, in this case the Tabalong Regency Transportation Service. The main assets owned by the Tabalong Regency Transportation Service (Drivers, Public transport equipped with GPS) are tools that can be used to carry out management control, which in turn will be able to regulate and supervise the activities of City Transport Car Drivers so that they have performance according to the SOP and SETK that has been enforced. So that in the end it will be able to

produce optimal service output for the community using City Transport Cars in the Tabalong Regency area, and on the other hand the strength of the main resources with competitive advantages owned by the Tabalong Regency Transportation Service will be able to support the preparation of achieving the Tabalong Regency target towards Tabalong Smart City.

The installation of this GPS application at least has an impact on decreasing the trend of imposing sanctions on drivers who commit violations in 2018 to 2020, although there are also other sanctions that are not related to indiscipline monitored by GPS, such as not coming to work without explanation and leaving work on time, work for no apparent reason. However, with the decrease in the number of perpetrators of this abuse, at least it proves the positive effect of increasing the performance of City Transport Car Drivers after GPS installation.

However, the implementation of investigations and the application of sanctions by supervisors still needs to be firmer. It can be seen from the observation that supervisors are still too tolerant of several reasons put forward by the driver. Regulations must be the basis for enforcing discipline. For example, if the break time is 1 hour, then the implementation must be appropriate, there are no exceptions, especially for trivial reasons, such as the use of time to eat too long. Also, in the case of speed violations for reasons of chasing passengers. This cannot be a tolerable excuse because passengers must be educated to be disciplined in waiting for the arrival and departure of vehicles.

The Tabalong Regency Government must also consider that the transportation applications that have been developed can be linked to existing and popular applications in the community. This is to maximize the use of the application, and to avoid people's excuses because the phone's memory is already full, so they are not interested in downloading the application. Do not let this application become useless in the future.

In the pandemic covid-19 era of 2020, the City Transport Car service activity will still be carried out even though not all car units operate at the same time. The unit operates on a shift system by setting a schedule for which unit will operate. Thus, the drivers and supervisors will also continue to work according to their shifts. And this condition will still be carried out in 2021 due to the Covid-19 pandemic which has not yet ended.

In line with the aspirations of the Tabalong Regency Government to go to Tabalong Smart City, the Tabalong Regency Transportation Service will continue to strive to provide maximum city transportation car services to meet the needs of land transportation within the city for the people of Tabalong Regency by

preparing quality resources, both in terms of resources, reliable human resources and modern technological resources, in accordance with the mission of the Tabalong Regency Government point 3, namely "Realizing independence by building and developing potential resources".

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