International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 23s, 2025
https://www.theaspd.com/ijes.php

The Effectiveness Of Single Drivers In The Distribution Of Goods Using Tronton Truck Transportation Modes In Central Java And DIY Regions

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Abstract
The transportation sector plays a strategic role in supporting economic, social, and cultural development, as well as influencing the mobility and distribution of goods. In the freight transportation sector, the trucking industry in Indonesia faces challenges in the form of tight competition, low barriers to entry, and rampant illegal levies. These conditions affect the operational efficiency of transportation companies trying to survive amidst these challenges. This study aims to analyze the effectiveness of using a single driver in the distribution of goods using tronton trucks in Central Java and the Special Region of Yogyakarta to improve logistics efficiency. This study uses a qualitative approach to collect and analyze data from various sources to evaluate the effectiveness of using a single driver in the distribution of goods using tronton trucks, as well as its impact on logistics efficiency and illegal levies. This study found that the effectiveness of the distribution of goods using a single driver with tronton trucks in Central Java and the Special Region of Yogyakarta is influenced by factors such as infrastructure, operational strategies, and the use of modern technology. Although technology such as GPS improves efficiency, challenges related to driver fatigue and geographical conditions are still significant. Working time management, driver training, and infrastructure support are key to creating an efficient and safe distribution system. The successful implementation of this strategy requires synergy between companies, technology, and other stakeholders.
Keywords: *Driver, Distribution of Goods, Transportation, Truck, Central Java, Special Region of Yogyakarta (DIY).*

A. INTRODUCTION

The transportation sector is one of the links in the well-developed passenger and goods distribution network and has a strategic role in supporting development in various aspects, such as politics, economy, socio-culture, and defense and security. The role of transportation in supporting this development is very visible in its integration with increasingly complex economic activities (Gao et al., 2024). The growth of the transportation sector is not only an indicator of direct economic growth but also a driving force in increasing the mobility and efficiency of the distribution of goods and services. Therefore, transportation facilities play an important and strategic role as a link between regions and as a catalyst in accelerating national, regional, and local economic growth (Li et al., 2023). A successful transportation sector can be seen from its ability to support and encourage increased economic activity at various levels while strengthening national unity. Transportation is a vital facility that not only smooths the wheels of the economy but also influences all aspects of the life of the nation and state. The importance of land, sea, and air transportation is reflected in the increasing need for transportation services, both for the mobility of people and goods (Prus & Sikora, 2021).

In the context of goods transportation, the freight truck sector in Indonesia faces various quite complex challenges. This industry shows a very tight level of competition due to the large number of private companies engaged in the field of freight transportation. The low barrier to entry factor in this sector is one of the main causes, where almost every business actor can easily enter the market and offer their services. The absence of strict regulations governing the entry of companies into the freight transport sector or restrictions on certain routes further expands the scope of operations of freight transport vehicles (Sugianto et al., 2023). Trucks and other vehicles have the freedom to operate in various regions without certain legal restrictions. However, due to this tight competition, many freight transport companies have to operate with very thin profit margins. This condition creates additional challenges for business actors to survive during increasingly fierce competition while continuing to try to meet the increasing needs of logistics mobility (Sindi & Woodman, 2021).

The structure of transportation companies in Indonesia reflects the diversity of the scale of operations ranging from several regional trucking fleets to trucks owned and operated by individual owners. Freight forwarding companies are one of the main types of operators in this sector, where they rent out trucks to other companies to transport goods. These companies are often referred to as 'general' trucking companies because they transport a wide range of general goods without any particular specialization (Halim, 2023). In addition, there are also cargo companies or shipping companies that operate their fleet of trucks. These companies usually handle the transportation of large volumes of cargo, according to the scale of their business. Not only that, many companies, both small and large, prefer to operate their fleet of trucks to maintain efficiency and full control over their logistics operations (de Bittencourt et al., 2021).

However, the trucking industry is not free from serious challenges, one of which is illegal levies which are a major obstacle to operations. Illegal levies add significant costs to the land transportation industry. This phenomenon occurs because trucks often carry excess loads, and drivers are often less aware of the various types of official levies required. In this situation, drivers become vulnerable to illegal levies, which are often considered "security money" (Shooshtarian et al., 2022). Truck owners often prefer to pay these illegal levies because the costs are considered cheaper compared to the official fees that must be paid due to load limit violations. However, the existence of these illegal levies creates a dilemma for the industry, considering that this practice is not only financially detrimental but also reflects weak enforcement of regulations and governance in the land transportation sector (Asare et al., 2024).

The purpose of this study is to analyze the effectiveness of using a single driver in the distribution of goods using tronton truck transportation in Central Java and DIY. This study focuses on how this operational strategy can improve logistics efficiency amidst challenges such as high competition in the freight industry, illegal levies, and fleet management by transportation companies.

B. LITERATURE REVIEW

1. Effectiveness

Effectiveness is the ability to determine adequate goals or in Drucker's opinion effectiveness is doing something right. Effectiveness is knowledge about the relationship between actual results and expected results. Several experts explain effectiveness, including those put forward by Sumanth that effectiveness is how well goals can be achieved, and is an achievement compared to what might be achieved while maintaining quality. Furthermore, Stoner explains that effectiveness is a broad concept that includes various factors inside and outside the organization that are related to the level of success of the organization in achieving organizational goals or objectives (Crosby & Ghanbarpour, 2023).

It can be said that organizational effectiveness is the level of success of an organization in achieving its goals or objectives, a level of organizational ability in determining the right targets or doing the right job. An organization can be said to be effective in achieving its goals, in general, has 4 requirements, namely: (1) top management provides flexible room for movement to managers; (2) managers have authority following their responsibilities; (3) workers receive proper compensation; and (4) its structure is simple (Anwar & Abdullah, 2021). In addition, an organization can be said to be effective in achieving its goals if supported by the following factors

a. Improving HR capabilities: increasing loyalty, improving ethical behavior, decentralization, managing cultural conflicts and conflicts of interest.
b. Improving work methods: scientific research
c. Adequate working capital: increasing permanent capital
d. Adjusting work targets
e. Increasing productivity: increasing output and reducing costs (Zhang et al., 2023).

In essence, organizational effectiveness is the speed and accuracy of achieving goals that can be described as follows:

a. If the goal of an organization is to increase productivity, then the way to achieve that goal is potential human resources.
b. If the goal of an organization is to increase the potential of human resources, then the way to achieve that goal is education and training.

c. If the goal of an organization is to have input available, then the way to achieve that goal is to have sophisticated information available.
d. If the goal of an organization is to increase stability, then the way to achieve that goal is that management must be adaptive to environmental changes (Mohamed et al., 2022).

Based on the explanation above, effectiveness is a measure of whether or not an organization is successful in achieving its goals. Effectiveness does not state how much it costs to achieve those goals. A public sector organization can be said to be effective if the organization can achieve its stated goals (Al-Okaily et al., 2023).

2. Truck Driver

A driver is a person who drives a vehicle, either a motorized vehicle, or a person who directly supervises prospective drivers who are learning to drive a motorized vehicle or a non-motorized vehicle such as a bendi/dokar, also known as a coachman, a pedicab driver as a pedicab driver (Watson-Brown et al., 2021). A car driver is also known as a driver, while a motorcycle driver is also known as a rider. When driving a vehicle, a driver is required to follow traffic procedures. A person who has taken the test and passed the theory and practical driving tests will be issued a Driving License (SIM) (Yu & Tsai, 2021).

The driver's obligations are regulated in the UULAJ (Traffic and Transportation Service Law) CHAPTER VII, Article 23 paragraph (1), concerning and around traffic, namely:

a. Able to drive his vehicle reasonably, namely without being influenced by illness, or drinking something containing alcohol, or drugs that affect his ability to drive his vehicle.
b. Prioritize the safety of pedestrians.
c. Show STNK, SIM, or other proof.
d. Comply with traffic signs and road markings.

3. Truck

In the classification of goods vehicles that have been determined by regional regulations to maintain safety in traffic and road transportation, it is a rule that the vehicle load must be following the road capacity. Therefore, supervision is needed so that goods transport drivers reduce their load according to applicable traffic regulations (Oakey et al., 2022). The types of goods transport vehicles and the car's carrying capacity can be seen in the following table:

Table 1. Types of Transport Vehicles and Car Carrying Capacity

Axis Configuration	Number of Axes	Vehicle Type	JBI Class II	JBI Class III
1-1	2	Single axle truck	12	12
1-2	2	Big truck	16	14
1-2.2	3	Tronton truck	22	20
1-2-2-2	3	Trailer truck	36	30
1.1-2.2	4	4 axle truck	30	26
1 - 2 - 2.2	4	Articulated truck	34	28
1 - 2.2 - 2.2	5	Articulated truck	40	32
1-2.2 - 2.2.2	6	Articulated truck	43	40

Based on the table above, the 1-1 axle configuration means having 2 axles with a single truck type that is allowed to download with a permitted weight of 12 tons on class II roads and 12 tons on class III roads. The 1-2 axle configuration means having 2 axles with a large truck type that can download with a permitted weight of 16 tons on class II roads and 14 tons on class III roads. The 1-2.2 axle configuration means having 3 axles with a tronton truck type that is allowed to download with a permitted weight of 22 tons on class II roads and 20 tons on class III roads. The 1-2-2-2 axle configuration means having 3 axles with an articulated truck type that is allowed to fill with a permitted weight of 36 tons on class II roads and 30 tons on class III roads. Axle configuration 1.1-2.2 means having 4 axles with a 4-axle truck type that can listen with a permitted weight of 30 tons on class II roads and 26 tons on class III roads. Axle configuration 1-2-2.2 means having 4 axles with a candi truck type that can sound with a permitted

weight of 34 tons on class II roads and 28 tons on class III roads. Axle configuration 1-2.2-2.2 means having 5 axles with a tow truck type that can load with a permitted weight of 40 tons on class II roads and 32 tons on class III roads, axle configuration 1-2.2-2.2.2 means having 6 axles with a tow truck type that can load with a permitted weight of 43 tons on class II roads and 40 tons on class III roads. Those are the types of cars that are commonly used on the road to transport goods to be sent to other areas.

4. Mode of Transportation

Transportation is defined as an effort to move, move, transport, or divert an object from one place to another so that in another location the object becomes more useful or can be useful for certain purposes. The movement of goods or people Service of tools or vehicles from and to geographically separated locations is the definition of transportation according to Steenbrink (Mohandu & Kubendiran, 2021). Meanwhile, according to Morlok, transportation is the activity of moving or transporting something from one location to another. Then according to Bowersox, transportation is the movement of passengers or goods from one location to another, where the product is moved to the location needed. So in general transportation is a form of movement of something, either goods or people from one location to another, Service or without Service facilities (Cedillo-Campos et al., 2022).

The mode of transportation or type of transportation service that will be discussed in this study discusses public transportation, or for more details, it can be seen below. The selection of modes/transportation is the most important model in transportation planning. This is because of the key role of public transportation in various transportation policies. The problem of choosing a mode can be said to be the most important stage in transportation planning and policy (Hörcher & Tirachini, 2021). Meanwhile, according to Jotin and Lall, the chosen mode of travel also depends on several factors such as the purpose of the trip, the distance traveled, and the income of the traveler, which then also takes into account other derivative factors from the three factors mentioned previously, including travel costs and travel time (Anwari et al., 2021).

In addition, the choice of mode also considers the movement of more than one mode of service during the trip. This type of movement is very common in Indonesia, although it can occur in big cities in Indonesia. In this case, there is a combination of several modes to reach a point of origin or destination, such as a combination of transportation to reach the destination to be reached (Irawan et al., 2021).

a. Private Transportation Mode

Private transportation is transportation that uses private vehicles, such as private cars, motorbikes, and bicycles, but can also be bus services that are usually used for personal needs. Private transportation is the opposite of public transportation. Transportation with private vehicle services is usually more expensive than public transportation services due to the better efficiency of public transportation (Munawar et al., 2022).

b. Public Transportation Mode

Public transportation is all types of transportation modes that are supplied for the needs of the general public in meeting their needs, both land, sea, and air transportation. Urban passenger public transportation is all types of public transportation that serves passenger trips from the place of origin to the destination in urban areas (Neumann, 2021). Public transportation is a means of urban transportation that cannot be separated from the urban activity system, especially for people who use public transportation and do not have other choices of modes to carry out activities. The basic purpose of providing public transportation is to provide good, reliable, comfortable, safe, fast, and cheap transportation services for the public (Ceder, 2021).

C. METHOD

This study uses a qualitative approach to obtain in-depth and relevant data related to the effectiveness of using a single driver in the distribution of goods using the tronton truck transportation mode. Research data will be collected through various sources, including previous studies, relevant research results, and interviews with practitioners and related parties in the freight transportation sector. This approach allows researchers to explore broader perspectives and understand the phenomena in the freight transportation industry more holistically. After the data is collected, the data will be analyzed systematically to identify factors that influence logistics efficiency, as well as the impact of illegal levies on the operations of

transportation companies. This analysis process aims to provide a clearer picture of how the single-driver operational strategy can be applied to improve efficiency in the distribution of goods.

D. RESULT AND DISCUSSION

1. Analysis of the Effectiveness of Single Driver in Goods Distribution

The effectiveness of a single driver in distributing goods is one of the important aspects in determining the success of delivery, especially in areas with high levels of logistics activity such as Central Java and the Special Region of Yogyakarta. In this context, the speed of delivery of goods is one of the main indicators that can reflect the success of a distribution system that uses a single driver (Büttgen et al., 2021). Delivery speed does not only depend on the driver's ability to operate the vehicle, but is also influenced by route selection, road infrastructure conditions, and coordination between the logistics center and drivers in the field. In some cases, a single driver can provide advantages in terms of time efficiency due to faster decision-making regarding route changes or emergency conditions on the road. However, the challenges that arise are also not few, especially when drivers have to face heavy traffic conditions or limited access to the destination location.

In terms of productivity, the single-driver system shows the potential to increase operational efficiency, especially in goods deliveries that do not require driver changes during the trip. Compared to the multiple-driver system, a single driver can reduce labor costs while minimizing complexity in crew management (Bruzzone et al., 2021). However, this productivity is highly dependent on the driver's ability to carry out their duties consistently without disruption caused by external or internal factors. In this case, driver health is a critical aspect that should not be ignored. Excessive workload, including long travel durations without sufficient rest, can have a negative impact on the physical and mental condition of drivers, ultimately affecting the punctuality of deliveries and the overall quality of logistics services.

Time management is also an important element in the single-driver system, where drivers must be able to manage departure schedules, rest breaks, and delivery completion efficiently. In practice, drivers often face pressure to complete deliveries in a short time, especially in situations where there are many requests from customers. This pressure, if not balanced with good management support, can trigger a high risk of fatigue (Pilz et al., 2022). Fatigue experienced by single drivers not only affects their ability to maintain concentration on the road but also increases the risk of accidents that have the potential to hinder the overall distribution of goods. Therefore, logistics companies need to pay special attention to providing supporting facilities, such as adequate rest areas along the route and time management training for drivers.

Furthermore, the success of the single-driver system in distributing goods is also influenced by the driver's level of adaptation to various challenges in the field. In Central Java and the Special Region of Yogyakarta, where road infrastructure and geographical conditions can vary greatly, the driver's ability to deal with less-than-ideal road conditions, such as narrow, hilly, or potholed roads, is a determining factor in maintaining smooth distribution. In addition, the use of technology such as GPS-based navigation systems can help drivers choose the best route and avoid areas with high levels of congestion. This technology not only helps to increase the speed of delivery but also reduces the stress experienced by drivers due to uncertainty on the road.

Thus, although the single-driver system has a number of advantages in terms of efficiency and productivity, its success is highly dependent on various interrelated factors, ranging from time management, and driver health, to infrastructure and technology support. A holistic approach that includes fatigue risk management, driver training, and delivery route optimization is essential to ensure the effectiveness of this system in supporting the distribution needs of goods in the research area.

2. Occupational Safety Challenges and Driver Conditions

The challenge of work safety and driver conditions is one of the crucial issues in the operation of goods distribution systems, especially those that rely on single drivers. In this system, drivers have a great responsibility to complete goods deliveries on time, often with long routes and tight schedules. This increases the risk of fatigue which can interfere with their concentration and reflexes while driving (Dong et al., 2022). This fatigue is one of the main causes of road accidents, because drivers who run out of energy tend to experience a decrease in the ability to make quick decisions, anticipate emergencies, or

maintain vehicle stability, especially when operating large trucks such as trontons. With working hours that sometimes exceed eight hours a day, drivers often do not get adequate rest time, which ultimately significantly affects their physical and mental health.

In addition to fatigue, long distances and varying road conditions are also factors that affect driver work safety. In Central Java and the Special Region of Yogyakarta, road conditions can vary greatly, from smooth highways to narrow and potholed village roads. This uncertainty requires drivers to always be aware of risks such as vehicle damage, traffic jams, or bad weather that can extend travel time (Qin et al., 2021). This condition not only increases physical stress on drivers but also mental stress, especially when they have to face tight deadlines. In some cases, less-than-ideal road conditions force drivers to take alternative routes that they may not be familiar with, increasing the risk of navigation errors or accidents due to a lack of information about the route.

The role of logistics companies in supporting driver safety is very important in this context. Good supervision by the company can help reduce the risks faced by drivers during the delivery process. One step that can be taken is to implement an integrated safety management system, such as real-time trip monitoring using GPS technology (Peters et al., 2021). With this monitoring, the company can provide up-to-date information on road conditions, weather, or the best route that can be taken by the driver. In addition, the company must also ensure that drivers get enough rest time, for example by setting a work schedule that is not too busy and providing rest facilities along the route. These efforts can help reduce the risk of fatigue and maintain the physical and mental condition of the driver.

Occupational safety training is also an integral part of the logistics company's responsibility. Drivers need to be equipped with the knowledge and skills to deal with emergency situations on the road, such as how to handle vehicles in bad weather conditions or how to respond to accidents quickly and appropriately. In addition, companies must also routinely conduct health checks for drivers, because good health is one of the main requirements for maintaining safety during the trip. This check can include physical health tests, stress level evaluations, and monitoring of driver sleep habits. With this holistic approach, companies can ensure that drivers are always in optimal condition to carry out their duties.

The challenges of occupational safety and driver conditions in a single-driver system cannot be ignored, because factors such as fatigue, distance traveled, road conditions, and the role of the company are interrelated and affect the overall performance of the driver. Consistent support from the company, whether through strict supervision, safety training, or the provision of supporting facilities, is essential to creating a safer and more productive working environment for drivers. With these steps, the risks faced by drivers can be minimized, while ensuring that the goods distribution system runs smoothly and efficiently.

3. Operational Efficiency of Tronton Truck Transportation Mode

The operational efficiency of the tronton truck transportation mode plays an important role in meeting the needs of goods distribution, especially in Central Java and the Special Region of Yogyakarta, which are the centers of logistics activity in Indonesia. Large carrying capacity is one of the main advantages of tronton trucks because it allows the transportation of significant quantities of goods in one trip (Jelti & Saadani, 2024). With a carrying capacity that can reach tens of tons, this mode of transportation is ideal for the distribution of heavy goods such as construction materials, agricultural products, or manufactured products. The use of tronton trucks allows the consolidation of goods from various suppliers into one delivery unit, thereby reducing the frequency of trips and increasing overall efficiency. However, success in maximizing this carrying capacity also depends on careful logistics planning, including optimization of delivery routes and load management to ensure that goods distribution runs smoothly without any obstacles.

Fuel efficiency is another crucial element in tronton truck operations, especially in a single-driver system that relies on one driver to complete distribution tasks. The fuel consumption of tronton trucks is usually higher compared to smaller logistics vehicles, given the large size and weight of the vehicle. Therefore, efficient fuel management can directly affect operational costs (Dadsena et al., 2023). In this context, the use of technology such as telematics-based vehicle management systems can help monitor and manage fuel consumption in real-time. Drivers also need to be provided with training to adopt fuel-efficient driving styles, such as maintaining a constant speed, avoiding sudden braking, and minimizing engine

idling time. Fuel efficiency not only reduces operational costs but also makes a positive contribution to environmental sustainability by reducing carbon emissions.

In addition to carrying capacity and fuel efficiency, the ability of tronton trucks to adapt to logistical challenges in certain geographic areas is also an important factor in determining the success of their operations. Central Java and the Special Region of Yogyakarta have diverse geographic conditions, ranging from lowlands to hilly areas that require special attention in route management and delivery strategies. Tronton trucks face challenges such as less-than-ideal road conditions in some areas, including potholes, and narrow, or steep roads, which can affect vehicle stability and travel time. To overcome these obstacles, logistics companies need to invest resources in routine vehicle maintenance, including checking brakes, tires, and suspension systems. In addition, the use of advanced navigation technology is also a solution to help drivers find the best route and avoid areas that are difficult to pass (Teshome et al., 2024).

The ability of tronton trucks to meet the needs of efficient distribution of goods is also determined by the integration of operational systems that include communication between drivers, companies, and customers. In a single-driver system, continuous communication is key to monitoring delivery status in real-time and addressing problems that may arise in the field, such as delays or schedule changes. Logistics companies need to ensure that drivers have access to reliable communication technology, such as mobile devices with a stable network so that they can provide live updates on delivery progress. This approach not only improves operational efficiency but also builds customer trust in the reliability of logistics services.

Thus, the operational efficiency of tronton trucks in the goods distribution system involves a combination of optimal utilization of transport capacity, careful fuel management, and adaptation to geographical challenges. Good technological support and logistics planning are important elements to ensure that this mode of transportation can operate optimally and make a significant contribution to the smooth distribution of goods in the research area. The strategic steps taken by logistics companies to improve this efficiency not only provide economic benefits but also strengthen the competitiveness of the logistics industry in facing future challenges.

4. The Influence of Central Java and DIY Regional Infrastructure on the Distribution of Goods

The infrastructure of the Central Java and DIY regions plays a very significant role in supporting the distribution of goods, considering that this region is one of the economic and logistics centers in Indonesia. The condition of the main road infrastructure is one of the main determinants in ensuring the smooth flow of goods from one location to another. The main roads connecting big cities such as Semarang, Yogyakarta, Solo, and the surrounding areas generally have good quality, with wide lanes and relatively smooth surfaces (Jalolova et al., 2022). This allows vehicles such as tronton trucks to traverse the route faster and safer so that delivery times can be minimized. However, outside the main route, there are many secondary roads that still face obstacles such as road damage, lack of lighting, and the presence of obstacles such as overflowing markets, which can slow down the distribution process. The difference in road quality creates challenges for drivers and logistics companies in planning efficient deliveries.

Geographical factors also have a major influence on the effectiveness of goods distribution in this region. The diverse topography of Central Java and DIY, ranging from lowlands along the northern coast to mountains in the southern part, is a challenge in planning logistics routes. In mountainous areas such as the Dieng or Gunungkidul areas, drivers often face steep slopes, winding roads, and the risk of landslides that can affect the speed of travel and the safety of transporting goods. In addition, accessibility to certain areas, especially in rural or remote areas, is still a significant obstacle. Some areas only have small roads that are inadequate for large trucks such as tronton trucks, so special strategies are needed, such as diverting loads to smaller vehicles or using alternative routes. These factors require a flexible and adaptive logistics approach to ensure that goods can still be distributed smoothly despite geographical obstacles (Kaiser & Barstow, 2022).

The biggest challenge faced in the distribution of goods in Central Java and the Special Region of Yogyakarta is areas where road infrastructure is inadequate. Several areas, especially in rural areas, still have roads that are full of holes, narrow, or even unpaved. This condition not only slows down delivery but also increases the risk of vehicle damage, which can ultimately increase operational costs. For example, drivers have to spend more time on the road to avoid damage, or logistics companies have to allocate

additional funds for more intensive vehicle maintenance due to traveling on difficult roads. On the other hand, the absence of bridges or river crossing access in certain areas is also a major obstacle, especially when distribution is carried out during the rainy season which can cause flooding or inundated roads.

The local government has attempted to overcome this infrastructure problem by allocating a budget for the construction and repair of roads in areas that are the main routes for the distribution of goods. However, the process of improving this infrastructure is often hampered by other problems such as budget constraints, slow bureaucratic processes, and land conflicts that hinder the construction of new roads (Bonilla et al., 2023). On the other hand, the role of logistics companies and the private sector is also important in overcoming this obstacle, such as through cooperation with the government in partnership programs to improve the quality of infrastructure in strategic areas. In addition, technologies such as GPS-based road monitoring systems can be used to help drivers identify the best routes, avoid problem areas, and minimize the impact of less-than-ideal road conditions.

Overall, the impact of Central Java and DIY infrastructure on the distribution of goods is very complex and involves various aspects, ranging from the quality of main roads to unique geographic challenges. Resolving these infrastructure constraints requires collaboration between the government, logistics companies, and local communities to ensure that the distribution of goods can run efficiently, despite the various challenges that exist. Better infrastructure will not only improve the effectiveness of the distribution of goods but also strengthen the region's economic competitiveness at the national and international levels.

5. Strategy to Increase the Effectiveness of Goods Distribution

Increasing the effectiveness of goods distribution is a major challenge in the world of logistics, especially in areas with diverse geographical and infrastructure characteristics such as Central Java and the Special Region of Yogyakarta. One very effective strategy is the use of modern technology to support drivers in carrying out their duties (Io Storto & Evangelista, 2023). GPS technology and route management applications, for example, have brought significant changes to trip planning. With the help of this technology, drivers can access real-time information on traffic conditions, the fastest routes, and potential obstacles on the road. In addition, this application also allows logistics companies to monitor vehicle movements, provide direct guidance to drivers, and dynamically adjust routes if necessary. The implementation of this kind of technology not only saves delivery time but also reduces fuel consumption and operational costs, thus creating a more efficient and environmentally friendly distribution system.

In addition to technology, good work scheduling and the implementation of shift rotation are important steps in maintaining driver health and productivity. Fatigue is one of the main risks in goods distribution, especially for single drivers who have to travel long distances without the help of other drivers. With an efficiently designed work schedule, drivers' rest time can be optimized so that they have enough energy to complete their tasks safely (Battini et al., 2022). Shift rotation also helps ensure that each driver has a balanced working time and is not exposed to excessive fatigue, which can reduce the risk of road accidents. This strategy requires good coordination between logistics companies and drivers, including the implementation of a digital scheduling system that allows for transparent and easily accessible shift management.

The role of logistics companies is also very important in ensuring the sustainability of efficient and safe operations. One step that can be taken is to provide regular training to drivers, not only related to safe driving techniques but also skills in using modern technology. With adequate training, drivers can be more confident and skilled in facing various challenges in the field (Shah et al., 2021). In addition, companies must also provide supporting facilities, such as comfortable rest areas along the route, regular health checks for drivers, and psychological support services. These steps demonstrate the company's commitment to maintaining the welfare of drivers, which will ultimately increase their loyalty and performance.

Furthermore, logistics companies need to implement sustainability strategies in their operations to ensure the effectiveness of distribution in the long term. One approach that can be taken is to optimize the vehicle fleet by choosing trucks that are more fuel-efficient and environmentally friendly. In addition, good inventory and warehousing management can also help reduce delivery waiting times, making the distribution process faster and more efficient. The use of a data-based supply chain management system

can help companies predict demand, plan routes more efficiently, and reduce the risk of delays. With this approach, companies can optimize their resources, reduce waste, and provide better service to customers. Collaboration between various parties is also key to increasing the effectiveness of goods distribution. Local governments, for example, can support logistics companies by providing adequate infrastructure and accelerating the licensing process for logistics vehicles. Meanwhile, local communities can contribute by providing information on road conditions or helping to create a conducive environment for logistics operations. Close cooperation between logistics companies, the government, and the community will create a distribution ecosystem that is more resilient and adaptive to various challenges that may arise. These strategies, if implemented consistently, will not only increase the effectiveness of goods distribution but also provide significant economic benefits for all parties involved.

E. CONCLUSION

The effectiveness of goods distribution using a single driver with a tronton truck transportation mode in Central Java and the Special Region of Yogyakarta is greatly influenced by various factors, ranging from infrastructure conditions to operational strategies implemented. The use of modern technology such as GPS and route management applications has proven to have a positive impact on increasing delivery time efficiency and reducing operational costs. However, significant challenges remain, especially related to the risk of driver fatigue, work safety, and adaptation to geographical conditions and uneven regional infrastructure. With the right approach, the single-driver system has great potential to become an efficient and sustainable distribution solution. Effective strategies include managing working hours and shift rotations to ensure driver health, as well as increasing the role of logistics companies in providing technical support and supporting facilities. On the other hand, fleet optimization, driver training, and collaboration with the government and local communities are important steps in creating a resilient logistics ecosystem. By integrating these various aspects, goods distribution can be carried out more efficiently without ignoring the safety and welfare factors of drivers. The effectiveness of goods distribution using a single-driver system can be achieved if there is synergy between technology, operational management, and adequate infrastructure support. Therefore, the success of implementing this strategy does not only depend on the internal capabilities of the logistics company, but also requires the active involvement of various stakeholders to create a distribution system that is more efficient, safe, and adaptive to logistics challenges in the research area.

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