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Implementation of Lean Management in Reducing Waste and Increasing Productivity of Intercity Bus Transportation PT. RAPI

Muhammad Syahrozi Lubis[1*], Nurlaila[2], Nurbaiti[3]
[1*,2,3]Universitas Islam Negeri Sumatera Utara, Jl. William Iskandar Ps. V, Medan Estate, Kec. Percut Sei Tuan, Kabupaten Deli Serdang, Sumatera Utara 20371, Indonesia

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Email Correspondence :
syahrozilubis1@gmail.com

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ABSTRACT

This study analyzes the application of management in improving the operational effectiveness of intercity bus transportation at PT. NEAT. Management plays a crucial role in managing resources through the Planning, Organizing, Actuating, and Controlling (POAC) functions so that operational activities can run efficiently and productively. However, public transportation still frequently faces obstacles in the form of waste and inefficiency that impact the decline in service quality and customer satisfaction. To address these issues, this study uses the Lean Management approach, a management method that focuses on eliminating non-value-added activities to increase productivity. The study was conducted using a qualitative descriptive method through interviews and observations. This research method also involves identifying improvements to process flow and measuring performance before and after improvements. Academically, this research is based on the concept of operational productivity which emphasizes the elimination of non-value added activities to increase service efficiency. The results show that the main waste at PT. RAPI is waiting time and defects (bus damage), which causes increased operational costs and a decrease in the number of passengers served. Improvements that have been made include more efficient fleet scheduling, planned bus maintenance, and digitalization of administration. The implications of this study emphasize the importance of improving the quality of human resources, both through skills training, increased work discipline, and strengthened employee responsibility, so that the implementation of Lean Management can run more optimally and sustainably.

ABSTRAK

Penelitian ini menganalisis penerapan manajemen dalam meningkatkan efektivitas operasional transportasi bus antarkota pada PT. NEAT. Manajemen memegang peranan penting dalam pengelolaan sumber daya melalui fungsi Perencanaan, Pengorganisasian, Pelaksanaan, dan Pengendalian (POAC) agar kegiatan operasional dapat berjalan secara efisien dan produktif. Namun demikian, transportasi umum masih kerap menghadapi berbagai kendala berupa pemborosan dan inefisiensi yang berdampak pada penurunan kualitas layanan serta kepuasan pelanggan. Untuk mengatasi permasalahan tersebut, penelitian ini menggunakan pendekatan Lean Management, yaitu metode manajemen yang berfokus pada penghapusan aktivitas yang tidak bernilai tambah guna meningkatkan produktivitas. Penelitian dilakukan dengan metode deskriptif kualitatif melalui wawancara dan observasi. Metode ini juga mencakup identifikasi perbaikan alur proses serta pengukuran kinerja sebelum dan sesudah dilakukan perbaikan. Secara akademik, penelitian ini berlandaskan pada konsep produktivitas operasional yang menekankan pengurangan aktivitas non–value added sebagai upaya meningkatkan efisiensi layanan. Hasil penelitian menunjukkan bahwa pemborosan utama yang terjadi di PT. RAPI adalah waktu tunggu (waiting time) dan cacat layanan berupa kerusakan bus (defects), yang berdampak pada meningkatnya biaya operasional serta menurunnya jumlah penumpang yang dapat dilayani. Perbaikan yang telah dilakukan meliputi penjadwalan armada yang lebih efisien, perencanaan pemeliharaan bus secara sistematis, serta digitalisasi administrasi. Implikasi penelitian ini menegaskan pentingnya peningkatan kualitas sumber daya manusia, baik melalui pelatihan keterampilan, peningkatan disiplin kerja, maupun penguatan tanggung jawab karyawan, agar implementasi Lean Management dapat berjalan secara optimal dan berkelanjutan.

INTRODUCTION

Public transportation is a means of transportation provided to serve the collective mobility of the community. According to Law No. 22 of 2009 concerning Road Traffic and Transportation, public transportation is a vehicle provided to transport people or goods for a fee, whether operating on a route (on-route transportation) or not on a route (off-route transportation). The existence of public transportation is very important to support community mobility, reduce congestion, and reduce air pollution levels (Awahah et al., 2024).

Public transportation services using public motorized vehicles on routes refer to public transportation systems that operate on specific routes or routes designated by the government. This system typically involves public transportation such as buses, public transportation (angkot), or microbuses. According to Minister of Transportation Regulation No. PM 15 of 2019, public transportation on routes must meet minimum service standards, including safety, security, comfort, affordability, equity, and regularity. However, in its implementation, several inhibiting factors have been identified, including inadequacies in policy, implementation, targets, environment, processes, and utilization (Larasasti et al., 2023).

Lean ManagementLean is a systematic approach aimed at managing and improving operational processes by identifying and eliminating waste and focusing on creating added value for customers (Ayaad et al., 2022). In the context of intercity bus transportation, such as that operated by PT. RAPI, this approach is highly relevant for increasing service efficiency and reducing non-value-added activities, such as long waiting times, inefficient departure schedules, and high operational costs. The primary focus of Lean is to simplify processes and improve workflows, thereby improving overall efficiency and service quality (Ayaad et al., 2022).

One of the basic principles of Lean is to create greater value for customers with minimal resource use (Putri & Saputra, 2023). Although originally developed in the manufacturing industry, the Lean Management concept has now been successfully adapted and applied to various sectors, including transportation services, with significant results in improving productivity and operational quality. The implementation of Lean at PT. RAPI is expected to be a solution to address waste issues and simultaneously increase productivity in intercity transportation services (Sutopo & Sudianto, 2025). Lean emphasizes principles such as value identification, value stream mapping, and waste reduction, all of which can be applied in context (Demilza et al., 2024).

To measure the success of Lean implementation, a clear understanding of productivity as a key indicator of operational efficiency is necessary. According to Stephens et al. (2012), productivity refers to the metrics and output measures of a production process, used to assess how efficiently resources such as labor, raw materials, and time are used to produce goods or services. In a technical or engineering context, productivity is often measured by comparing the amount of output produced to the input used, thus serving as an indicator of efficiency and effectiveness in the production process (Syayuti et al., 2023).

Based on the website ptrapibus.com, PT. RAPI Founded in 1998, PT. Raja Perdana Inti (RAPI) has been a transportation service provider that prioritizes safety, comfort, and punctuality for more than two decades. With 27 years of experience, the company now serves around 60,000 passengers annually, covering more than 50 destinations spread across the island of Sumatra. Not only providing scheduled passenger transportation services, PT. RAPI also offers a variety of additional services to meet customer needs comprehensively. One of them is RAPI Kilat, a reliable fast package delivery service to various destinations. In addition, PT. RAPI provides flexible and affordable

charter services for various purposes, such as business trips, conventions, school activities, and others.

In carrying out its operations, PT. RAPI adheres to a vision to be a solution to transportation problems in an increasingly crowded world. The company's mission is to become a leading provider of intercity and interprovincial transportation services, prioritizing service quality, safety, and comfort for customers. PT. RAPI also continues to develop an integrated service network and is committed to improving the quality of existing services. Through the use of modern technology and a reliable fleet, the company strives to provide a reliable, timely, and competitively priced travel experience.

Based on field interviews, one of the main problems faced by PT. RAPI is the high level of waste and low productivity in its intercity bus transportation operations. Waste occurs in various forms, such as inefficient departure schedules that result in long passenger waiting times, and suboptimal fleet rotation. Furthermore, high fleet maintenance costs due to unplanned maintenance schedules also place a significant burden on the company's operational costs. This problem directly impacts customer satisfaction levels, who expect timely, comfortable, and reliable service. On the other hand, PT. RAPI's productivity is also hampered by the underutilization of its fleet, minimal coordination between divisions, and a weak monitoring and evaluation system for service performance. This results in a suboptimal number of passengers served and an under-realization of the company's revenue potential. If left unchecked, this condition not only reduces operational efficiency but also risks undermining the company's competitiveness in the increasingly competitive land transportation industry. Therefore, an innovative and measurable managerial approach is needed to identify and address various forms of waste that occur, while simultaneously increasing service productivity. One approach that has proven effective in the transportation sector is Lean Management.

In PT. RAPI's operations, Bus A is scheduled to depart from Medan to Jambi every Monday. However, at one point, Bus A experienced technical difficulties and was unable to depart as scheduled. To address this issue, the management replaced the fleet with Bus B, which had a different route and departure schedule. This sudden adjustment disrupted the departure schedule, resulting in service delays, increased passenger waiting times, and inefficient fleet utilization. This situation indicates waste in the form of idle time (waiting) and suboptimal scheduling, which has implications for decreasing company productivity.

Lean Managementhas the main objective of eliminating all forms of waste in operational processes while increasing added value for customers. In the context of PT. RAPI, waste that occurs such as inefficient departure schedules, suboptimal fleet rotation, and long passenger waiting times can be identified, analyzed, and minimized using Lean Management principles. This approach can also improve inter-divisional coordination, maximize fleet utilization, and strengthen the performance evaluation system, thereby increasing company productivity and meeting customer satisfaction. Thus, Lean Management is a relevant and targeted method to address the main problems raised in the research title.

Many studies have been conducted on the application of Lean Management in the transportation sector, primarily focusing on improving operational efficiency in general. One such study is by Sutopo & Sudianto (2025), which examines how Lean Management can drive operational performance improvements in transportation service companies. Ayunita et al. (2024) focused more on the application of lean concepts in the manufacturing sector, emphasizing operational efficiency, waste reduction, and product quality improvement in mass production environments. Meanwhile, Maulana et al. (2023) examined the application of Lean in the home industry production line of CV.

Mandiri Jaya using the WAM and VALSAT approaches to identify and minimize waste in the manufacturing process. However, previous studies have not specifically addressed the types of waste that occur and their impact on service productivity, particularly in intercity bus transportation.

Some studies in Indonesia have explored the application of lean management to reduce waste and improve operational efficiency, such as the study of Tri Ngudi Wiyatno & Panji (2025) who examined Lean Management in the operations of PT Kereta Api Indonesia (PT KAI) found that the application of lean was able to identify waste such as long waiting times and inefficient processes and increase operational efficiency by ±25%, but this study is qualitative and has not been specifically on intercity bus transportation (train case study context; qualitative case study; waste identified & strategic recommendations formulated; limited focus on one major mode of transportation); Harsya Febbraio Setiawan & Kalbuana (2025) studied Lean Management to reduce baggage waiting time at Sultan Hasanuddin airport terminal with a VSM approach and thematic coding analysis, which showed types of waste such as waiting and motion, but the context is airport services not land transportation (descriptive qualitative; VSM; increasing service process efficiency; limited to one service facility not a mode of transportation); and Benny Kusmayadi & Vikaliana (2023) studied lean to reduce waste in truck distribution with a qualitative approach that found waiting time as the dominant waste, but the context was distribution of goods not passenger services (distribution context; qualitative methods; waste identification; limitations in distribution of goods); these three studies show that although lean has been used in various service and transportation sectors in Indonesia, there is a gap especially in the application of lean focused on intercity bus transportation with fleet productivity measurements and its impact on passenger services, so that research at PT. RAPI is an important contribution to fill this gap.. Reducing waiting times and increasing punctuality, Generally on city buses, not long-distance intercity routes; this critical synthesis shows the gap that lean research in the transportation service sector is still dominant in the urban context and has not discussed much about the integration of waste reduction with fleet productivity measurements in intercity bus services, so that the study at PT. RAPI is important to expand the theoretical application of lean while providing contextual empirical evidence in the Indonesian land transportation industry.

This research is novel because it examines the application of Lean Management specifically to intercity bus transportation, a topic that has not been widely discussed in previous studies. The main focus of this research is to identify waste and improve operational productivity at PT. RAPI. The objective of this study is to analyze how Lean Management can be applied to reduce waste and improve the efficiency of transportation services.

LITERATURE

Productivity

Productivity is a measure of efficiency that shows the ratio between output produced and input used. According to Sink and Tuttle (1989), productivity encompasses not only efficiency but also effectiveness and quality (Wiyatno & Panji, 2025). Productivity can be defined as a person's ability and mentality to strive to improve desired results. This is achieved through enthusiasm and a strong work ethic, developing personal competencies, and improving work quality and efficiency. Therefore, productivity is the ratio between desired results or targets and the total available resources (Rizka et al., 2024).

Operational Management

Operational management is a field that focuses on planning, organizing, and supervising production processes and managing resources to produce goods and services. According to Heizer and Render (2014), the main objectives of operational management are to create efficiency, increase productivity, and meet customer needs (Wiyatno & Panji, 2025). The objectives of the management process are to ensure timely completion of a project, ensuring appropriate costs, ensuring no additional costs beyond the budgeted cost plan, ensuring quality meets requirements, and ensuring the smooth running of the project process.(Cuandra, 2023). According to William J. Stevenson (2009), operational management refers to the process of planning, organizing, and controlling systems aimed at producing goods or services that meet customer desires (Komariah, 2022).(Sylvia & Sitio, 2020)Operational management is a series of activities or activities that create product value, whether in the form of goods or services, through the process of transforming input into output. The orientation of operational management has expanded and is oriented towards quality, cost, speed of delivery, and flexibility of the process.(Faiq et al., 2021)Operational management stems from the management of business resources, consisting of goods and services, to ensure efficient business operations. Therefore, operations management requires a management structure that is established and implemented according to its respective functions. The highest leader in this structure is the operations manager.(Wahjono, 2021).

Lean Management

Lean emphasizes principles such as value identification, value stream mapping, and waste reduction, all of which can be applied in a transportation context.(Demilza et al., 2024)Lean Management theory originates from the Toyota Production System (TPS) management philosophy designed by Taiichi Ohno. Taiichi Ohno (1988) described the goal of TPS as an effort to reduce the time from when a customer places an order until the company receives money from the customer by eliminating waste that has no added value. Therefore, according to Lean Management theory, service effectiveness and efficiency can be achieved by reducing waste from non-value-added activities to products offered to consumers (Fauziyah, 2023). According to Womack and Jones (1996) in Tri Ngudi Wiyatno & Panji (2025), Lean Management focuses on five main principles, namely:

(1) Identify values, Determine what customers consider valuable.
(2) Value stream mapping, Identify all steps in the production process to find activities that do not add value.
(3) Creating a smooth flow, Eliminate bottlenecks in the process to ensure efficient workflow.
(4) Pull system, Producing goods or services only according to customer demand to avoid overproduction.
(5) Continuous improvement, Make continuous improvements to increase efficiency and quality.

Waste

According to Gaspersz (2011) in Komariah (2022) Waste is any activity that does not provide added value in the process of transforming input into output in the value stream. Waste has two categories, namely Type One Waste and Type Two Waste. Type One Waste is a work activity that has no added value, but cannot be avoided, for example inspection and sorting activities. Type Two Waste is an activity that does not produce added value and must be immediately eliminated, for example defective products. Type Two Waste is often referred to as waste, because it is waste that must be identified and eliminated. In today's economic conditions, it is essential to reduce waste and increase business efficiency, so finding low-cost solutions, accompanied by increasing value at the same time for both customers and companies is crucial.(Febrianty et al., 2022).

Waste reduction mechanisms in Lean Management improve service productivity by eliminating non-value-added activities, resulting in faster, more stable, and more efficient process flows. In intercity bus transportation operations, waste such as long departure waiting times, asynchronous schedules, unnecessary crew movements, repetitive administrative processes, and inefficient fuel use lead to inflated service cycle times and low fleet utilization. When such waste is reduced through workflow restructuring, procedure standardization, scheduling improvements, and data-driven operational controls, travel and downtime can be reduced, trip frequency increased, and fleet and workforce utilization optimized. Consequently, service output increases without significantly increasing resources, operational costs per trip decrease, punctuality improves, and service quality is more consistent. Thus, waste elimination directly improves the ratio between output (number of effective trips, passengers transported, punctuality) and input (time, fuel, fleet, workforce), which is the core of productivity improvement in service systems.

According to Womack & Jones (1996) in Putri et al (2025), 7 Wastes are seven types of waste in the production process which include: overproduction, waiting, unnecessary transportation, overprocessing, excess inventory, unnecessary motion, and defects.

RESEARCH METHOD

This study uses a qualitative descriptive method to provide an in-depth overview and explanation of the application of Lean Management in reducing waste and increasing the productivity of intercity bus transportation at PT. RAPI. According to Sugiyono (2020), qualitative research is conducted in natural conditions with the researcher as the main instrument, using triangulation techniques in data collection, and inductive analysis. This study does not focus on generalizing the results, but rather on a detailed contextual understanding. Data collected in the form of words or images, not numbers, are then analyzed and described to facilitate understanding by the reader.

The approach used is phenomenological, with the goal of understanding the experiences and symptoms faced by research subjects in the context of transportation management. Data sources are divided into two: primary and secondary data. Primary data was obtained directly from the field through observation, interviews, and documentation of the management and operational staff of PT. RAPI. Meanwhile, secondary data was obtained from various literature sources such as books, journals, reports, and relevant previous research to strengthen the analysis.

The data collection method was carried out through direct observation of transportation operational activities, in-depth interviews with internal sources of PT. RAPI regarding waste and productivity, as well as documentation from company archives and internal records. All of these methods were aimed at gaining a comprehensive understanding of how Lean Management is implemented as a solution to reduce waste and increase the efficiency and productivity of intercity bus transportation services. Interviews and observations were conducted with key sources, namely the Directors, Field Coordinators, Mechanics, Drivers, and Administrative Staff of PT RAPI, so that the data obtained truly depicts the real conditions of the company's operations. This research was formulated as a qualitative descriptive case study at PT. RAPI which aims to understand in depth how the implementation of Lean Management is able to reduce waste and increase the productivity of intercity bus transportation operations. The data analysis process follows the data reduction stages which include: (1) selection of data from observations, interviews, and documentation that are relevant to operational processes and types of waste, (2) data simplification by grouping information based on service stages (fleet preparation, departure, travel, arrival), and (3) drawing focus on findings directly related to value-added and non-value-added activities. Furthermore, a qualitative coding approach was used, namely open coding to identify initial categories of waste

and operational problems, axial coding to link these categories with their impact on efficiency and productivity, and selective coding to formulate core themes regarding lean-based process improvement mechanisms. Data validity was maintained through triangulation, which included source triangulation (management, operational staff, drivers), method triangulation (direct observation, in-depth interviews, documentation studies), and time triangulation (data collection at different operational periods), so that the research results had a stronger level of credibility and reliability in describing the actual conditions of the company's operations.

RESULT and DISCUSSION

Research result

PT. RAPI Profile

The owners of PT. Raja Perdana Inti, the PO Rapi bus company, are the husband and wife Norman Dinata (Koh Ahai) and his wife, who founded the company on December 22, 1998. Jalan Sisingamangaraja KM 6.8 No. 3, Jl. Sisingamangaraja, Harjosari I, Medan Amplas District, Medan City, North Sumatra 20229 PT. Raja Perdana Inti has been providing safe, comfortable, and punctual travel for RAPI passengers for 27 years. Today, PT. RAPI serves 60,000 passengers annually with 50 destinations on the island of Sumatra. Besides being known as a provider of scheduled transportation services, PT. RAPI also provides various additional services to meet customer needs. The RAPI Kilat service provides fast and reliable package delivery to all destinations. PT. RAPI also offers charter services for business, conventions, schools, and other needs at competitive prices. The company's vision is to be a reliable transportation solution for the community, while its mission includes improving service quality, developing service networks, and utilizing modern technology to support efficient operations.

Organizational Structure of PT RAPI

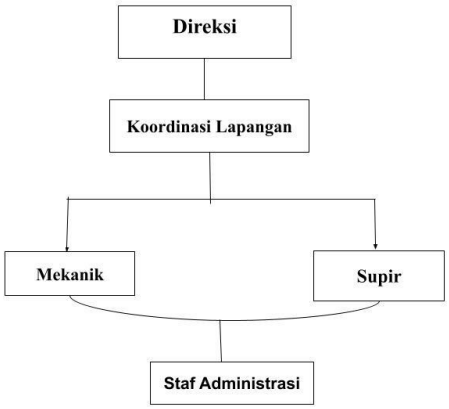

Figure 1 *Organizational Structure Chart of PT. RAPI*
Source: internal information source from *PT. RAPI*

The Impact of Waste on Increasing Productivity at PT. RAPI

Based on interviews with directors, drivers, field coordinators, administrative staff, and passengers, waste in PT. RAPI's operations has a direct impact on service punctuality, fleet utilization, and operational cost efficiency. The board of directors explained,

"We strive to ensure that every fleet is optimally utilized. Sometimes the fleet is ready, sometimes it is not, and this disrupts the departure rhythm so that the number of passengers that can be served is not optimal."

PT. RAPI's Field Coordinator said,

"Waiting is the most significant aspect. If a bus is late or broken down, operations in the field become unbalanced. Buses that should depart on time are delayed, resulting in disappointed passengers, and increased operational costs."

One driver also said,

"Some buses depart with almost half the seats empty, while others are packed. This leads to uneven fleet utilization and affects our daily income."

A PT. RAPI mechanic highlighted the impact of defects and inventory, saying,

"Sudden breakdowns often occur due to irregular maintenance schedules. We also sometimes have excess or insufficient spare parts, which slows down repairs and increases costs."

Administrative staff also added to the impact of motion and overprocessing,

"Document checks are repeated, and ticket validation is sometimes duplicated. This process increases work time, fatigues staff, and decreases administrative productivity."

From a passenger perspective, one informant said:

"If the bus is late and the administration is slow, the trip becomes uncomfortable. This also makes us hesitate to choose the same service again."

Overall, these interviews indicate that waste at PT. RAPI not only decreases customer satisfaction but also reduces operational efficiency and fleet productivity. The most impactful waste is waiting and defects, as these two types directly disrupt departure schedules, fleet utilization, and increase the company's operational costs.

Table 1 *Results of Identification of Forms of Waste in PT. RAPI Operations*

Types of Waste	Forms of Waste at PT. RAPI	Main Impact
Waiting	Delay in departure, idle bus	Passenger waitlong, chaotic schedule
Overproduction	The fleet departs with empty seats	High operating costs
Transportation	Route No efficient,diversion	Fuel consumption increases
Defects	Sudden bus breakdown	Cost repair high, delay
Inventory	Spare parts piling up/lacking, excess manual documents	Inventory imbalance
Motion	Repeated document checks, irregular loading and unloading	Longer working hours
Overprocessing	Double ticket validation	Slow service, passenger complaints

Source: *Results of interviews and field observations, (2025)*

Efforts to Implement Lean Management Principles at PT. RAPI

Based on interviews with directors, administrative staff, and mechanics, PT. RAPI has begun implementing Lean Management principles, although the implementation is still partial and not yet comprehensive.

The operations manager explains about process mapping,

"We started mapping the entire bus departure flow and administrative process to see where waste was occurring." By identifying these points, we could focus on improving the most inefficient processes."

Regarding inter-division coordination, the administrative staff added,

"We now routinely coordinate with the operations and mechanical departments. Any schedule changes or technical issues are immediately communicated through the internal group, minimizing delays."

A PT. RAPI mechanic highlighted the fleet's preventive maintenance efforts, saying,

"We have a routine maintenance schedule, although it's not completely consistent. But this step has helped reduce unexpected breakdowns and makes the fleet more ready for use."

Furthermore, administrative digitization has begun to be implemented. An administrative staff member explained,

"Some ticketing and passenger registration processes have begun using digital systems. This reduces redundancy and speeds up the departure process, although it hasn't been implemented on all routes yet."

However, the board of directors emphasized several challenges:

"The Lean approach hasn't been fully integrated across all lines. Staff understanding of Lean principles is still limited, and the performance monitoring system isn't comprehensive. Therefore, we still need further guidance and standardization."

Overall, these findings indicate that PT. RAPI has taken the initial steps in implementing Lean Management, particularly in waste mapping, divisional coordination, fleet maintenance, and administrative digitization. However, more consistent and comprehensive implementation is still needed to achieve maximum efficiency and increase the company's operational productivity.

Efficient Fleet Scheduling Productivity Improvement Strategy

a) Bus departure schedules are being created with greater flexibility by adjusting operating hours to accommodate passenger numbers and fleet conditions. This strategy aims to reduce departures with excessive empty capacity, thus optimizing fleet utilization and reducing inefficient operational costs.
b) *Lean management* also focuses on reducing waiting times, both for passengers at the terminal and during the fleet preparation process. By reducing waiting times, departure flows become smoother, the fleet can operate more frequently and on time, and delays are minimized. This not only improves passenger comfort but also impacts the company's overall productivity and competitiveness.

The directors of PT. Rapi stated,

"We have created a flexible departure schedule and adjusted the fleet size to the number of passengers to maximize fleet utilization and reduce waiting times."

Optimal Fleet Rotation

a) Allocating buses previously rarely used on main routes to additional routes or routes with high demand. This allows buses that are normally unused to remain in service and contribute to the service.
b) Through this rotation, the productivity level of each bus increases because the entire fleet is utilized evenly, not just concentrated on certain units.

A driver also stated, "Fleet rotation is now more closely monitored, previously idle buses are allocated to additional routes, thereby increasing the productivity of each bus."

Digitalization of Administration

a) Previously manual administrative processes, such as ticketing, passenger lists, departure reports, and bus spare parts inventory, are now shifting to digital systems based on computers and applications. This transformation aims to improve data accuracy and speed up administrative workflows.
b) The implementation of a digital system for ticketing and passenger data processing makes the validation process more practical and standardized. This not only reduces repetitive work but also supports smoother departure schedules with more controlled times.
c) On the other hand, digitizing bus spare part inventory provides benefits in managing operational components. While previously searching for spare parts was time-consuming and potentially delayed departures, with a digital system, availability can be monitored in real time. This simplifies the administrative and technical departments' efforts to ensure bus readiness before operation.

The Administrative Staff said,

"*The administrative process which was previously manual has now become digital, both for recording tickets and passenger data as well as for...*
bus spare parts inventory management. This implementation makes departure schedules more regular and minimizes the obstacles that typically arise from manual processes."

Scheduled Fleet Maintenance (Preventive Maintenance)

a) Carry out routine maintenance on the bus fleet, such as checking the engine, brakes, tires,and other important components regularly. This aims to prevent sudden breakdowns while the bus is in operation.
b) With a regular maintenance schedule, fleet readiness can be better assured. Buses that are ready for operation on schedule reduce the risk of departure delays and support smooth transportation operations.

According to the mechanic, "If a bus is checked regularly before it departs, it usually doesn't break down on the road. So, regular maintenance is crucial so the fleet can be used immediately upon scheduled departure without any technical issues."

Staff Training and Development

a) Providing training on Lean principles and work efficiency, specifically how to reduce non-value-added activities, accelerate service processes, and maintain administrative and operational order. Training can take the form of sharing sessions with management or regular guidance during work evaluations. This aligns with the opinion (Dharma, Budi, Asyhari, 2024) that training is crucial for improving workers' skills and capabilities to support their work, while also serving as a means of assessing a worker's ability to perform their duties.
b) Improving staff understanding of how to reduce waste and increase productivity. This involves direct coaching from management through monthly performance evaluations, guidance during staff meetings, and efficient work simulations.

One director explained,

"We see that staff need coaching to understand what efficiency means. Only when everyone has the same mindset can the company's productivity increase."

DISCUSSION

Implementing Lean Management to Reduce Waste at PT. RAPI

Lean Managementis a management approach that emphasizes reducing non-value-added activities (waste) and increasing the value of service for customers (Womack, JP, & Jones, 2003). In this study, it was found that the main waste that occurs at PT. RAPI is waiting (waiting time) and defects (bus damage). These two forms of waste directly disrupt departure schedules, increase operational costs, and (Ohno, 2018) reduce customer satisfaction. This is in line with the Seven Waste (Muda) concept in Lean, where waiting time and damage are among the most significant categories that contribute to decreased productivity (Waste in the form of waiting occurs because the departure schedule has not been arranged flexibly and is still adjusted to the number of passengers. This condition causes buses to often wait long at the terminal before departing. To overcome this problem, PT. RAPI began implementing more efficient fleet scheduling by adjusting the number of departures to field conditions. This effort has been proven to reduce waiting time while maximizing the utilization of the available fleet. According to (Kulkarni, 2007) proper schedule management can reduce wasted time and increase customer satisfaction.

Meanwhile, wasteful defects arise from unexpected bus breakdowns. These breakdowns cause delays in departure schedules and lead to customer complaints. Lean principles are implemented through scheduled preventive maintenance, where the bus fleet is routinely serviced to maintain operational readiness. This maintenance reduces the risk of sudden breakdowns, resulting in a more reliable fleet and increased productivity. This is in line with the view (Slack, N., Brandon-Jones, A., & Johnston, 2016) that preventive maintenance is essential for maintaining smooth operational processes.

Furthermore, previously manual administrative processes created repetitive work and slowed down the departure process. Manual recording systems have many weaknesses and higher risks than computerized systems, such as wasting time (Nurlaila, Nurlaila, Putri, 2022). Implementing Lean through digitizing administration is the right solution to expedite ticket and passenger data recording. This digitization not only reduces wasted time but also improves data accuracy and supports smooth operations. According to Chiarini et al. (2015), the integration of information technology in Lean Management plays a crucial role in increasing process efficiency.

Human resource management is the process of managing and developing an organization's workforce with the goal of ensuring that the organization has qualified, skilled, and motivated human resources to support the achievement of its goals (Syahriza & Harahap, M. Ikhsan, Lestari, 2023). Therefore, companies provide regular staff training and coaching. This program aims to help staff understand how to reduce non-value-added activities, speed up work processes, and improve the quality of service to passengers.

Overall, the implementation of Lean Management at PT. RAPI has yielded positive, albeit limited, results. Several measures, such as more efficient fleet scheduling, scheduled bus maintenance, administrative digitization, and staff training, have proven effective in reducing waste and increasing productivity. The tangible impact of these measures is evident in reduced waiting times, fewer unexpected fleet breakdowns, and increased cost efficiency and passenger satisfaction. Therefore, Lean Management can be a crucial strategy for improving the quality of public transportation services.

Implementing Lean Management to Increase Productivity at PT. RAPI

Management within a company must support the process of change to ensure its progress. A company's success or failure is greatly influenced by its progress (Aslami, Nuri, Adhairani Nasution, 2022).

The implementation of Lean Management at PT. RAPI is aimed at reducing waste while increasing the operational productivity of intercity bus transportation. The most prevalent forms of waste are waiting time and fleet defects, which impact departure schedules, fleet utilization, and operational costs. This finding aligns with research findings (Argiyantari, B., Simatupang, TM, & Basri, 2021), which confirms that implementing lean principles in transportation can improve operational performance and reduce non-value-added activities.

To address these issues, PT. RAPI implemented several key strategies. First, more efficient fleet scheduling by adjusting bus departures to passenger numbers, thereby reducing waiting times and optimizing fleet utilization. Second, the implementation of scheduled fleet maintenance (preventive maintenance) minimizes the risk of sudden breakdowns and maintains bus readiness. This aligns with research (Nauval, 2024) showing that preventive maintenance can reduce repair costs while maintaining smooth transportation operations. Third, administrative digitization through a digital ticketing and passenger data recording system accelerates service flows, reduces repetitive tasks, and improves data accuracy (Riana et al., 2024).

In addition to technical strategies, human resources (HR) also play a crucial role in the implementation of Lean Management. PT. RAPI regularly provides training to staff, drivers, mechanics, and administrative staff on the principles of work efficiency, how to reduce non-value-added activities, and improve service quality. Consistent with the findings of Afrida, Nasution, et al. (2024), HR management training has proven effective in increasing employee efficiency and effectiveness. Widiantari, Okayana, et al. (2024) also expressed similar sentiments, emphasizing that HR optimization through management and training can support a company's operational efficiency.

Overall, the implementation of Lean Management at PT. RAPI has shown positive results, although still partial. Efforts such as fleet scheduling, scheduled maintenance, administrative digitization, and human resource training have been proven to reduce waste and increase productivity. The tangible impacts include reduced waiting times, minimal fleet breakdowns, cost efficiency, and increased customer satisfaction. This reinforces the notion that Lean Management can be a crucial strategy for improving the quality of public transportation services in Indonesia. Furthermore, Lean implementation also plays a role in strengthening human resource competencies and performance, thereby making the company's operational processes more effective and measurable (Zainarti, Zainarti, Saleha et al., 2023).

This study provides new insights by demonstrating that in the context of intercity bus transportation, which is a service-based, dynamic, and subject to schedule variability and field conditions, waste manifests not only in physical activities but also in information asynchronous, service time variations, and operational uncertainty. These findings extend the theoretical understanding of Lean by emphasizing that in service operations, waste is more systemic and closely related to interfunctional coordination, rather than to single-process inefficiencies as often discussed in manufacturing contexts. Furthermore, the observed productivity improvements stem not solely from process acceleration but from service flow stabilization, which impacts schedule reliability, increased fleet utilization, and consistent service quality. This enriches the Lean framework in service operations by emphasizing the importance of integrating process efficiency and service reliability as dimensions of service productivity. Thus, the case of PT. RAPI contributes theoretically by demonstrating that Lean implementation in intercity transportation requires the

adaptation of Lean principles to manage service variability and operational synchronization, thus expanding the Lean framework from its traditional focus on eliminating non-value-added activities to a holistic approach based on service system stability, which is relevant for the development of Lean theory in complex, customer-oriented service sectors.

CONCLUSION & IMPLICATION

Based on the research results, it can be concluded that the application of Lean Management principles at PT. RAPI is able to identify various forms of waste that affect productivity, especially in the aspects of waiting time, overproduction, and inefficient processes. Efforts to implement Lean through fleet scheduling, resource optimization, and increased coordination between divisions have been proven to improve operational efficiency and service quality. Thus, the implementation of Lean Management is an effective strategy for PT. RAPI to minimize waste, increase productivity, and strengthen the company's competitiveness in the intercity transportation industry. Efforts to implement Lean through fleet scheduling, resource optimization, and increased coordination between divisions have been proven to improve operational efficiency and service quality. Thus, the implementation of Lean Management is an effective strategy for PT. RAPI to minimize waste, increase productivity, and strengthen the company's competitiveness in the intercity transportation industry. Furthermore, these findings indicate that increased productivity does not only come from accelerating work processes, but also from creating a more stable, coordinated, and standardized service flow, so that operational variations can be reduced and fleet utilization becomes more optimal. Conceptually, the results of this study confirm that Lean in the context of transportation services serves as a systemic management approach that integrates process efficiency with service reliability. Therefore, the successful implementation of Lean at PT. RAPI not only impacts the company's internal performance but also has broader implications for the development of a land transportation operational management model based on continuous improvement that is oriented towards customer value and long-term performance sustainability.

PT. RAPI is advised to continue strengthening its Lean Management implementation by focusing on reducing waiting times, improving coordination between divisions, and utilizing digital technology. Furthermore, further research could examine customer satisfaction and sustainability for more comprehensive results.

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