An Analysis of Optimalisation Transjakarta Fare Subsidies: A Crucial Study for the Future of Public Transportation

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Abstract: TransJakarta operates a Bus Rapid Transit network across the Greater Jakarta area, consisting of 13 primary corridors. The Jakarta government supports its operations through a Public Service Obligation, primarily in the form of fare subsidies. To ensure service equity and efficiency, subsidies must be allocated based on factors such as operational costs, service frequency, and passenger demand. This study evaluates financial disparities and subsidy distribution across three distinct corridors: Corridor 1 (high demand and frequency), Corridor 5 (moderate), and Corridor 12 (low demand and operational inefficiency).

The subsidy model reveals a significant gap between operating costs and revenue, highlighting the system's reliance on government support. Corridor 12 requires the highest subsidy, followed by Corridors 5 and 1, respectively. This reflects variations in demand, average trip length, and unit costs. The study recommends a dynamic, data-driven pricing model to improve financial sustainability while maintaining affordability and equitable access to public transportation.
Keywords: Demand, Operation Cost, Optimisation, Fare Subsidies

1. INTRODUCTION

Public transportation is the backbone of efficient and sustainable urban mobility in metropolitan cities i.e. Jakarta. There are several public transport modes which serve the people i.e BRT, Commuter Line, Mass Rapid Transit (MRT), and Light Rail Transit (LRT). In fact, the BRT is key role as the primary provider of public transportation services in Jakarta inhabitants. It has been serving since 2005, which known as TransJakarta (TJ). The system serves 13 corridors and 255 routes as shown in Figure 3 which covers approximately 82,3% of the population (Djoko Setijowarno, 2024).

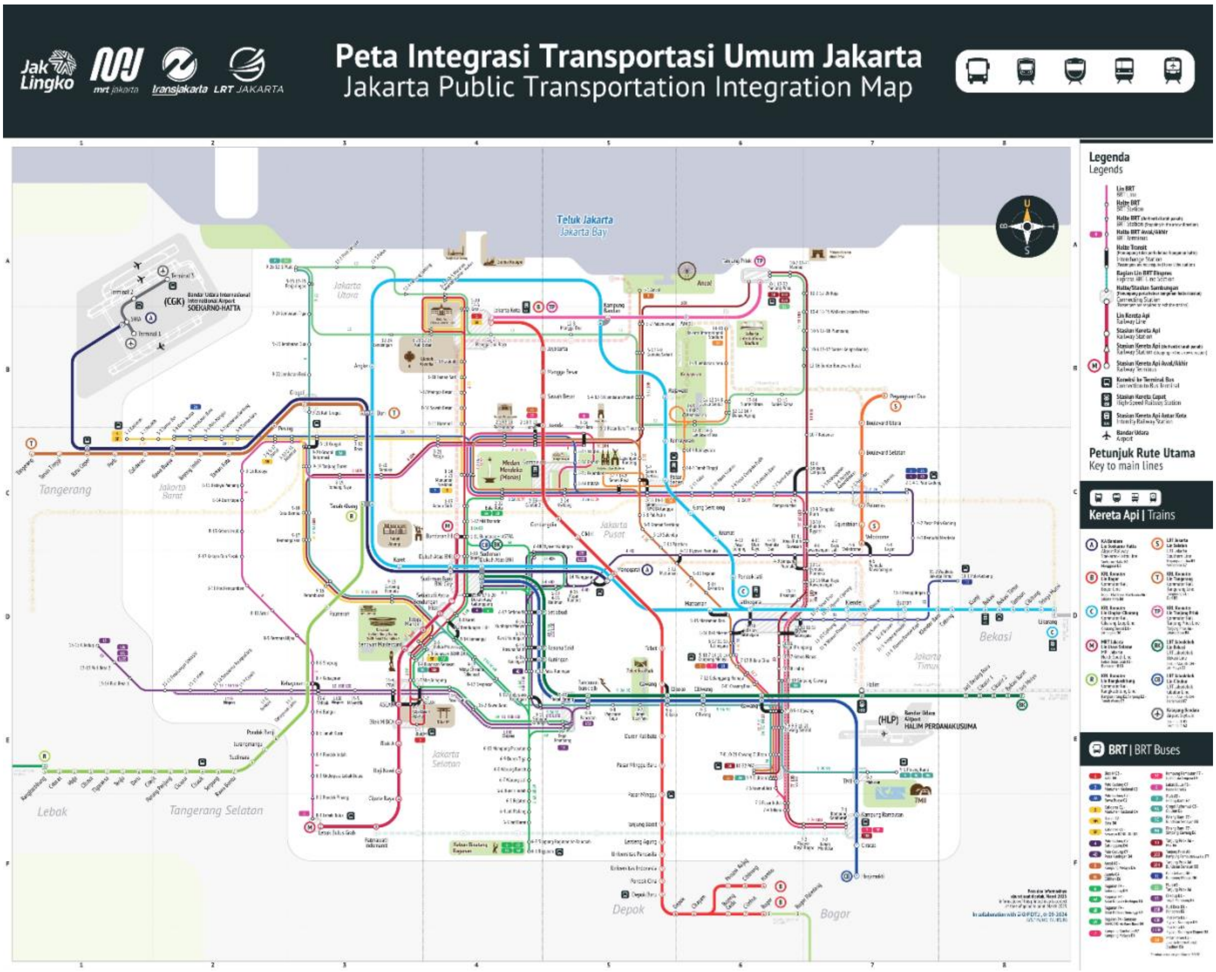

Figure 1. Jakarta Public Transportation Integration Map

Jakarta government supports the expansion and improvement of Transjakarta's service quality. They provide PSO thru fare subsidized scheme noting that the ticket fare has been remained at Rp. 3,500 since 2007. In fact, several financial and operational challenges have emerged to ensure reliable operations and the provision of high-quality services to the public. Therefore, a comprehensive analysis of customer fares is necessary. Fare adjustments are not just a choice, but a necessity in ensuring that Transjakarta continues to operate effectively, provides optimal accessibility to the public, and meets expected service standards.

Transjakarta's fares have remained unchanged since 2005. According to Jakarta Governor's Decree No. 1912 of 2005, the fare for Transjakarta bus services is set at Rp 3,500 (from 07:00 to 24:00) and Rp 2,000 (from 24:00 to 05:00). Meanwhile, operational costs have increased significantly in correspond to rising fuel prices, fleet maintenance costs, labour wages, and inflation. Indonesia's economic growth has consistently risen at an average rate of 5.0% per year for decades. The lack of correlation between rising operational costs and ticket prices has led to an increasing need for subsidies or Public Service Obligations (PSOs) to sustain Transjakarta's operations on a yearly basis. Although various efficiency measures have been implemented, fare adjustments remain necessary to ensure the long-term financial sustainability of Transjakarta.

This study, therefore, provides a comprehensive fare subsidy structure which considers various operational cost components, such as fleet maintenance, fuel costs, employee wages (including minimum wage), and other expenses. Through this study, Transjakarta aims to strike a proper balance between service quality and financial sustainability. It also seeks to ensure that the established fares are fair, support public accessibility, and align with the goals of developing an efficient and sustainable public transportation system in Jakarta. From an operational perspective, a public transportation system requires accurate planning to ensure that government-approved subsidies or PSO funds are utilised efficiently and effectively. This study will comprehensively evaluate Transjakarta's operational service scheme, with a focus on its key service corridors.

2. LITERATURE REVIEW

2.1 Fare and Subsidy Model

Public transport operation requires a significant investment (Nurcahyo et al., 2020), while the services should be recovered thru both the fare box and non-fare box income (Canzler et al., 2023). In fact, there is a gap between income and operation cost which should be covered by the transport authorities. Many cases shows that the transport authorities take the responsibility recovering the gap thru Public Services Obligation (PSO) scheme. PSO, which is known as subsidies, serve a critical function in ensuring service continuity Operational realities often reveal that public transport systems are unlikely to achieve financial self-sufficiency without external subsidies. The total cost curve, which illustrates operational deficits, underscores the insufficiency of fare revenues in fully covering operating expenditures. Therefore, there is an option for redirecting the subsidies from passengers to operators represents a strategic measure to support the long-term sustainability of public transportation systems (Sun et al., 2016).

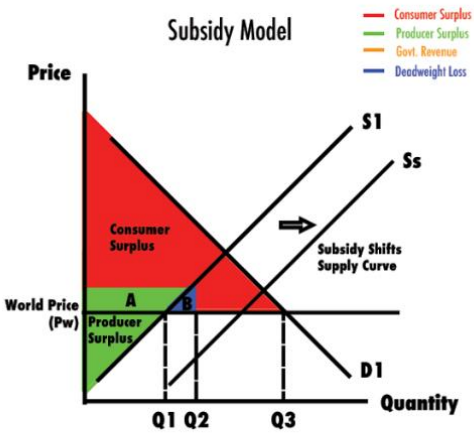

Figure 2. Subsidy Curve Model

From an economic standpoint, subsidies effectively reduce the average cost curve, thereby lowering the financial burden on users and promoting equitable access to transportation (Serebrisky et al., 2009). Moreover, subsidies impact the marginal cost curve by enabling strategic investments in operational efficiency, including route optimization, technological upgrades, and preventive maintenance.

In formulating subsidy policies or managing budgetary deficits, it is essential to strike a balance between operational efficiency and broader social welfare objectives. Cost curve analysis provides a rigorous framework for informed policy decisions, supporting the long-term financial sustainability of public transportation systems while safeguarding accessibility and service quality for diverse socioeconomic groups (Canzler et al., 2023).

The critical role of innovation in managing the cost components that shape fare structures

(Ceder (2007)). The integration of advanced technologies—such as fleet performance monitoring, predictive maintenance systems, and route optimization algorithms—can significantly reduce variable costs, enhance operational efficiency, and ultimately contribute to fare optimization. In the context of Bus Rapid Transit (BRT), Ceder's cost theory provides valuable insights into the financial complexities inherent in balancing economic sustainability with environmental goals.

2.2 Discrete Choice Model

The Discrete Choice Model (DCM) explains how decision-makers, such as individuals, households, businesses, or other entities, select from a set of available alternatives (Ben-Akiva & Lerman, 1985; Ortúzar & Willumsen, 2007; Train, 2009). This model is designed to determine which alternative is chosen, whereas regression models are typically used to measure the extent to which a factor influences a decision. The DCM is based on the principle of utility maximization, where decision-makers tend to choose the option that provides the highest utility among all available choices. The model comprises both observed and unobserved utility parameters, which are estimated based on the choices individuals make when faced with different scenarios. The utility function represents an individual's preference for selecting a particular transportation mode under hypothetical conditions, with people shifting towards the mode that offers the most significant benefit. Since utility follows a logistic distribution, the logit model is commonly applied as a forecasting tool to predict choices with sufficient detail (Ben-Akiva & Lerman, 1985; Fröidh, 2008; Train, 2009; Aloulou, 2018).

Several factors influence decision-making in transportation choices, including pricing, travel time, trip purpose, accessibility, socio-demographic characteristics, economic status, and gender. Individuals may have multiple transportation options at any given time, but can only select one mode for travelling between two points. The multinomial logit model captures this decision-making process by estimating the probability of selecting a specific transport mode based on explanatory variables. The model is mathematically represented as:

$$U_n^l(t) = \beta_l X_n^l(t) + \epsilon_n^l(t) \tag{1}$$

where,

$U_n^l(t)$: utility function for an individual n choosing transport mode l at time t.
$X_n^l(t)$: the vector of explanatory variables associated with individual n for alternative mode l
β_l : the vector of estimated parameters associated with mode l
$\epsilon_n^l(t)$: random error term

The probability of an individual choosing a specific transport mode is determined using the logit function:

$$P\big(l_n(t)\big) = \frac{exp\ (U_n^l(t))}{\Sigma_l exp U_n^l(t))} \tag{2}$$

where,

$P\big(l_n(t)\big)$: probability of individual n selecting mode l at time t

The Maximum Likelihood Estimation (MLE) method estimates model parameters. The likelihood function is given by:

$$LL = \sum_{n=1}^{N} \sum_{t=1}^{N} \sum_{l\epsilon\{1,2,3,\ldots,L\}} lnP(l_n(t)) \quad (3)$$

where,

N : total number of individuals in the sample

T_n : observed time periods for each individual

L : total number of available transport modes

The parameters are estimated iteratively, with an initial guess for β values, which are refined until they converge to stable values. This modelling approach provides a structured framework for analyzing transportation preferences, allowing researchers and policymakers to understand the factors influencing modal choices and to design policies that improve public transportation systems.

2.3 Stated Preference

Stated preference (SP) research technique refers to transportation research methods that involve individuals' responses to one or more hypothetical travel alternatives, which are typically presented as combinations of several attributes Davidson, J. D. (1973). The stated preference technique involves collecting responses from participants when they are presented with various alternative scenarios. This technique is beneficial for assessing consumer preferences before implementing new transportation technologies or services. The experimental method of the stated preference technique includes one of the components for constructing hypothetical choice alternatives, known as technologically feasible alternatives (Ortúzar, 1994).

The instruments used in the stated preference approach are presented as ranking data, ratings, or multiple-choice questions. One advantage of this survey technique is its flexibility in designing question methods for various situations, allowing for customisation based on research needs or variables. A key requirement for a successful stated preference survey is that respondents must answer realistically, and the alternatives provided must be feasible if implemented (Pearmain et al. (1990), Ortúzar (1994)).

After data compilation, statistical analysis uses specific intervals and parameters to determine which variables influence public preferences. Ortúzar (1994) stated that the stated preference method can rank the available choice alternatives, provided that these alternatives are technically feasible. The alternatives are constructed based on the factors to be analyzed to assess their influence on the research problem. The selected conditions and variables must ensure that respondents provide realistic answers.

A stated preference survey can determine respondents' Willingness to pay (WTP) for a particular travel alternative. This willingness to pay serves as a reference for relevant stakeholders in setting the pricing for a transportation mode or travel route, based on the alternatives presented in the study.

3. METHODS

This study employs a two-stage analytical framework comprising demand estimation through a stated preference (SP) survey and the calculation of operational costs to assess the potential subsidy requirements for Transjakarta services. The analytical approach is grounded in microeconomic theory, using a subsidy model graph to illustrate the interaction between demand, supply, fare levels, and government interventions.

The first stage involves the estimation of passenger demand using a stated preference method. A structured survey is administered to measure users' willingness to pay (WTP) and to identify their sensitivity to changes in fare levels. The data obtained are used to construct a mode choice probability model, which quantifies the likelihood of users selecting Transjakarta under varying fare scenarios. This model is then applied to the existing ridership base to generate a demand curve that reflects price elasticity.

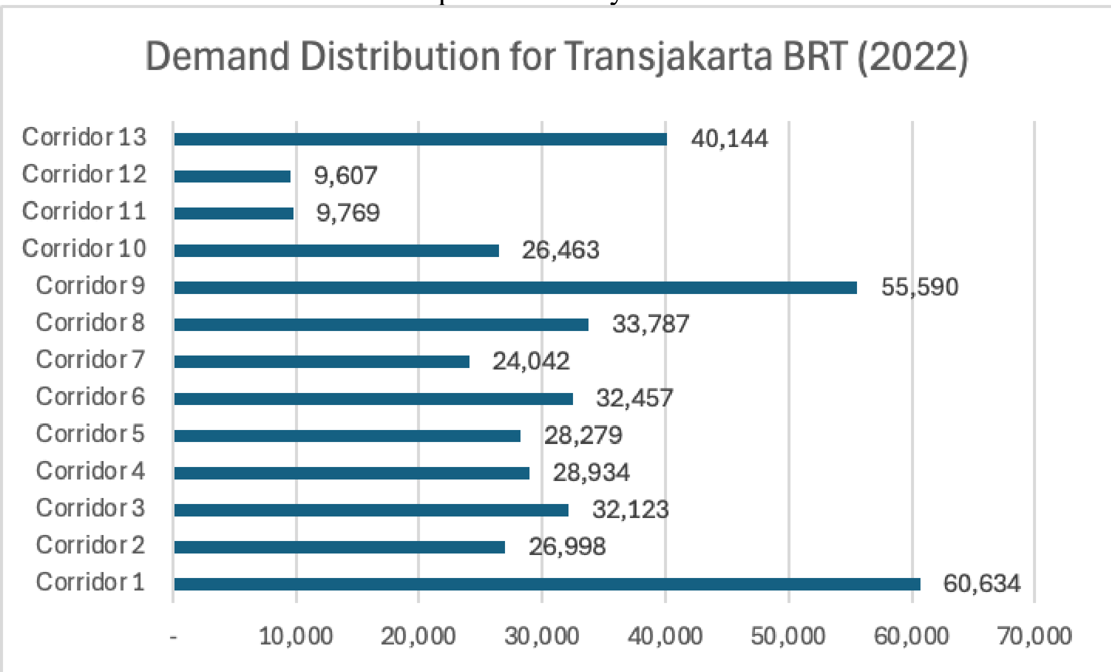

Figure 3. Demand Distribution for Each Corridors of Transjakarta (2022)

Respondents are sampled from three representative Transjakarta corridors: Corridor 1, which exhibits high passenger volume and serves the central business district; Corridor 5, characterized by medium demand and serving public service areas; and Corridor 12, which demonstrates a relatively low passenger-to-capacity ratio. The selection of these corridors aims to capture a broad range of operational and demand characteristics within the Transjakarta network.

The second stage entails the estimation of operational costs necessary to derive the supply curve. This includes the identification and quantification of various cost components, such as fleet requirements, personnel expenses, fuel or energy consumption, maintenance, and other supporting operational expenditures. Two distinct cost curves are developed: the first represents the actual operational costs under current conditions, while the second reflects projected costs based on the fulfilment of minimum service standards (*Standar Pelayanan Minimum*/SPM). These cost estimations are derived from available operational data and relevant institutional reports, supplemented by expert judgment where appropriate.

Following the estimation of both demand and cost, the analysis proceeds with the calculation of expected revenue and the extrapolation of subsidy requirements. Revenue is computed by multiplying projected ridership by the proposed fare, adjusted by the average trip length (ATL). The comparison between projected revenue and estimated operational costs at each fare level enables the identification of subsidy gaps. The resulting subsidy estimation provides insight into the financial support necessary to ensure service sustainability while maintaining affordability for users. This methodological framework offers a comprehensive basis for evaluating fare policies and their implications on public transport financing.

4. ANALYSIS

4.1 Willingness to Pay Analysis

The survey involved 1,900 respondents. Data analysis for the stated preference study will use the dependent variable of user choice and the independent variables of Transjakarta fare (X_1) and travel time savings (X_2). These variables were selected as they represent the "reward and punishment" components in the survey's hypothesis framework. The dependent variable captures respondents' choices, with each respondent evaluating sixteen scenarios combining different levels of fare and time savings. Notably, 165 BRT and non-BRT users consistently selected "No," indicating a preference for keeping the fare unchanged at IDR 3,500. The results of the modeling using binary logit are as follows:

$$\text{Model (U)} = 2{,}597 - 0{,}0001968X_1 + 1{,}019X_2$$

The probability is calculated to determine the potential demand for Transjakarta services. The probability equation used is shown in formula (2). Next, a sensitivity test is conducted with the resulting graph as follows.

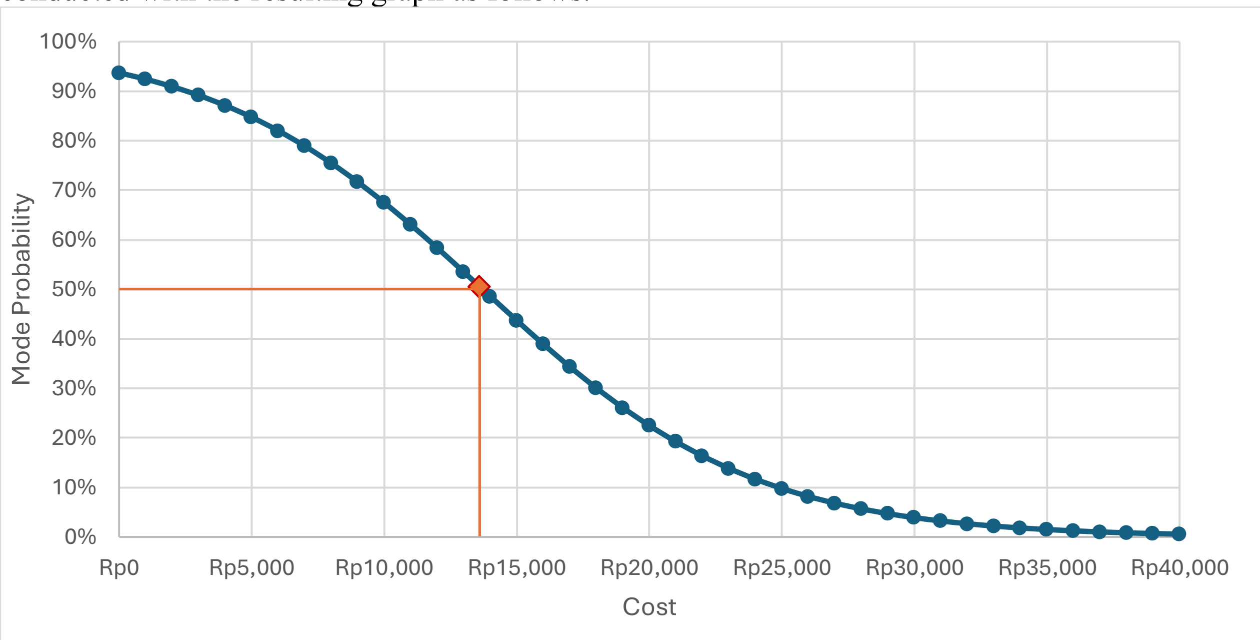

Figure 4. Sensitivity Graph of Transjakarta Services

The graph shows that at a 50% probability, users are willing to pay a fare of Rp13,714. This means that if the fare rises to Rp13,714, half of the population will stop using Transjakarta services. Based on Figure 4, demand equalization was carried out using the existing daily demand figures for each corridor, as obtained from Transjakarta 2022 data.

The proposed fare adjustment reflects a restructuring of the current system based on prevailing regulatory instruments and empirical evidence from stated preference analysis. The adjustment includes a IDR 2,000 fare for Mikrotrans services, which are currently provided at no charge under Jakarta Transportation Agency Decree No. 297/2018. An integrated fare cap of IDR 5,000 is maintained for transfers between Mikrotrans and BRT/Non-BRT services within a three-hour window, in accordance with Governor Regulation No. 97/2018, ensuring affordability for multimodal journeys.

The time-based fares under Governor Decree No. 1912/2005—IDR 2,000 during 05:00–07:00 and IDR 3,500 during 07:00–17:00—are proposed to be eliminated and replaced with a single flat rate, simplifying fare administration and improving transparency. The intermodal fare ceiling of IDR 10,000, as stipulated in Governor Decree No. 733/2022, remains unchanged for combined use of Transjakarta, LRT, and MRT services.

The proposed flat fare of IDR 5,000 for BRT and Non-BRT and for the integrated fare is supported by fare sensitivity analysis, which estimates that this level would result in a ridership decline of only 15,25%. This modest reduction is considered acceptable given the associated increase in farebox revenue and the potential to reduce the reliance on public subsidies through the Public Service Obligation (PSO) scheme.

4.2 Subsidized Corridor Fare Analysis

Transjakarta's operational plan from September 11 to 15, 2023, shows that the average cost incurred for one bus by big and medium buses is Rp4,352,798 (1 USD = 15,348 IDR) per day. Where the nominal daily operational cost of the bus is derived from the following components:

Table 1. Medium bus cost components

Component	Percentage	
	Medium Bus	Big Bus
Investment	15,81%	21,40%
Fuel	15,41%	18,41%
Driver	39,32%	26,19%
Maintenance	20,47%	24,24%
Overhead	8,99%	9,76%

The supply curve in the subsidy graph illustrates the extent to which producers are willing to provide a good or service at various price levels, particularly in the context of subsidies. In economic analysis, the supply curve typically slopes upward from left to right, indicating a positive relationship between price and the quantity supplied.

This analysis uses Rp per customer as the y-axis (price) and the number of customers as the x-axis (quantity of service). Below are the components used for each corridor. The number of trips (N) within the corridor used in the analysis represents the average daily trips calculated based on tap-in demand from September 11 to September 15, 2023. The number of trips serves as the divisor in the price per passenger-km calculation, acting as the customer variable. The minimum number of buses (N) is determined based on the minimum service standards (SPM) as defined in Governor Regulation No. 13 of 2019, which require a 5-minute headway during peak hours and a 10-minute headway during non-peak hours.

Table 2 details the minimum bus number, which is determined based on minimum service standards and the route length of each corridor. According to SPM, the minimum number of buses represents the lower bound when analyzing customer capacity and Rp per customer expenditure. Additionally, the minimum number of buses used between September 11 and September 15, 2023, in each corridor is also calculated as the upper bound of the supply curve.

Table 2. Trips of each corridor per day

Corridor	Number of Trips within the Corridor Bus	Minimum Number of Buses (SPM)
1	60,634	30
2	26,998	46
3	32,123	43
4	28,934	23
5	28,279	21
6	32,457	20
7	24,042	24
8	33,787	78
9	55,590	48
10	26,463	43
11	9,769	17
12	9,607	53
13	40,144	20
Sum	408,827	466

The subsidy model graph is developed based on data processing and the curves that have been described. It also illustrates the existing or current fare of Transjakarta bus services, which is Rp3,500. This fare is multiplied by the percentage of the intra-corridor Average Trip Length (ATL) relative to the total route length to represent the portion of the Transjakarta fare that is specifically allocated to that corridor. The following is the calculation of the current price adjusted to ATL for each corridor.

Table 3. Tabulation of the current price adjusted to ATL for each corridor

Corridor	Corridor 1	Corridor 5	Corridor 12
Current Price	3,500	3,500	3,500
Corridor Length (km)	12,9	13,5	23,75
Corridor Average Trip Length (km)	3,79	3,55	3,69
Current Price/ATL (Rp/km)	1,028	922	544

The following is the subsidy graph for Corridor 1. The graph consists of the demand curve, representing Willingness to Pay (WTP) in yellow; the supply curve, representing the average cost of bus provision in blue; and the revenue threshold, which is the fare paid by users multiplied by Average Trip Length (ATL), in orange. The supply curve is shown as linear, as it is derived from the existing bus operating data, which assumes a relatively constant cost per trip across demand levels

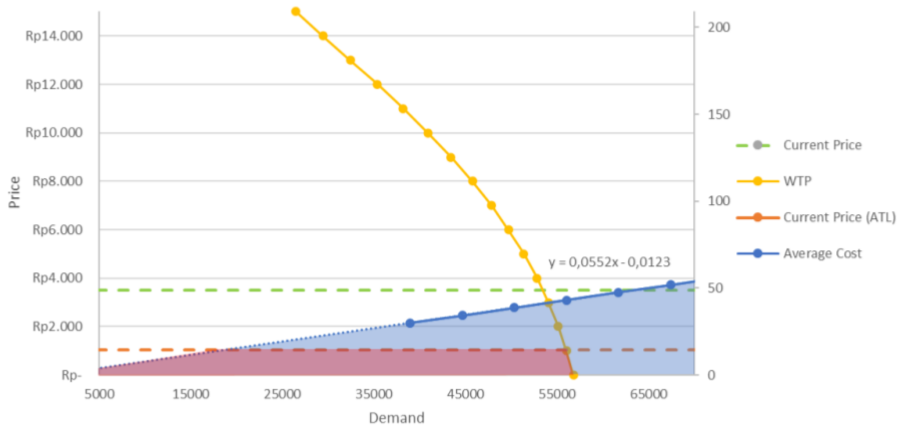

Figure 5. Subsidy Model Graph for Corridor 1

The red-coloured area represents the amount paid by customers or revenue. The blue-coloured area represents the costs borne by Transjakarta or expenses. The operational expenses exceed the revenue, resulting in a blue-red area, which signifies the loss incurred by the service provider. This loss can be used to adjust and determine the subsidy amount. Below is the detailed calculation of the area. In the equation, the y-variable represents the fare, while the x-variable represents demand or the number of customers.

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Table 4. Curve Functions in the Subsidy Model Graph for Corridor 1

Function	Equation/Value
f(y1) (WTP)	Demand*((exp(2,699-0,00197y))/(1-exp(2,699-0,00197y))
f(y2) (Average Cost)	(y+0,0123)/0,0552
f(x1) (Current Price (ATL))	1028,428159
f(y3) (Realization of Bus Capacity)	84500

Table 5. Subsidy Area Calculation in the Subsidy Model Graph for Corridor 1

Blue	
f(y3)dy	84500y+C
f(y2)dy	(-y(5000y+123)/552)+C
Upper Bound	Rp4.666
Lower Bound	0
f(y3)dy	Rp394.296.009,702
f(y2)dy	Rp197.226.179,626
Blue Area	Rp197.069.830,076

Red	
f(y1)dy	*Demand**100000*LN(ABS (EXP(c1+b1*y-1)))/197 +C
Demand	60634
c1	2,699
b1	-0,00197
Upper Bound	Rp1.028
Lower Bound	0
f(y1)dy	Rp62.357.713,007
f(y2)dy	Rp9.580.523,352
Red Area	Rp52.777.189,655
Corridor Subsidies	Rp144.292.640,421

The corridor subsidy represents the loss that is expected to be covered by the subsidy, which is calculated as the blue area minus the red area. Based on the data processing conducted, Corridor 1 is entitled to Rp144,292,640 to cover the operational losses.

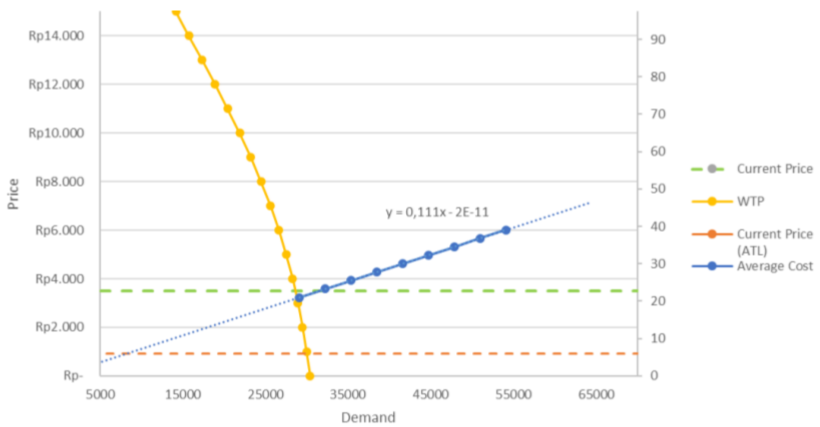

Figure 6. Subsidy Model Graph for Corridor 5

This figure illustrates the subsidy model for Corridor 5, showing the demand curve WTP, the supply curve (Average Cost of Bus Provision), and the revenue threshold (fare paid by users adjusted by ATL). The red area represents passenger revenue, while the blue represents the operational costs borne by Transjakarta. The difference between these areas indicates the subsidy required to cover this corridor's financial deficit.

Table 6. Curve Functions in the Subsidy Model Graph for Corridor 5

Function	Equation/Value

f(y1) (WTP)	*Demand**((exp(2,699-0,00197y))/(1-exp(2,699-0,00197y))
f(y2) (Average *Cost*)	(y+0,00000000002)/0,111
f(x1) (Current Price (ATL))	Rp922
f(y3) (Realization of Bus Capacity)	54080

This table presents the mathematical functions used to model the subsidy graph for Corridor 5. The demand function (WTP) follows a logistic distribution, while the supply function (Average Cost) follows a cost-per-kilometer calculation. The table also includes the current price per ATL and the realized bus capacity used in the analysis.

Table 7. Subsidy Area Calculation in the Subsidy Model Graph for Corridor 5

Blue	
f(y3)dy	54080y+C
f(y2)dy	(y(25000000000y+1)/5550000000)+C
Upper Bound	Rp6.003
Lower Bound	0
f(y3)dy	Rp324.642.801,827
f(y2)dy	Rp162.324.926,703
Blue Area	Rp162.317.875,123
Red	
f(y1)dy	*Demand**100000*LN(ABS(EXP(c1+b1*y-1)))/197 +C
Demand	28279
c1	2,699
b1	-0,00197
Upper Bound	Rp922
Lower Bound	0
f(y1)dy	Rp26.062.690,982
f(y2)dy	Rp3.826.109,890
Red Area	Rp22.236.581,092
Corridor Subsidies	Rp140.081.294,031

This table provides detailed area calculations for the subsidy analysis in Corridor 5. The blue area represents the total operational cost, while the red area represents passenger revenue. The difference between these two areas (blue minus red) results in the required subsidy amount, which is calculated to be Rp140,081,294.031 for Corridor 5.

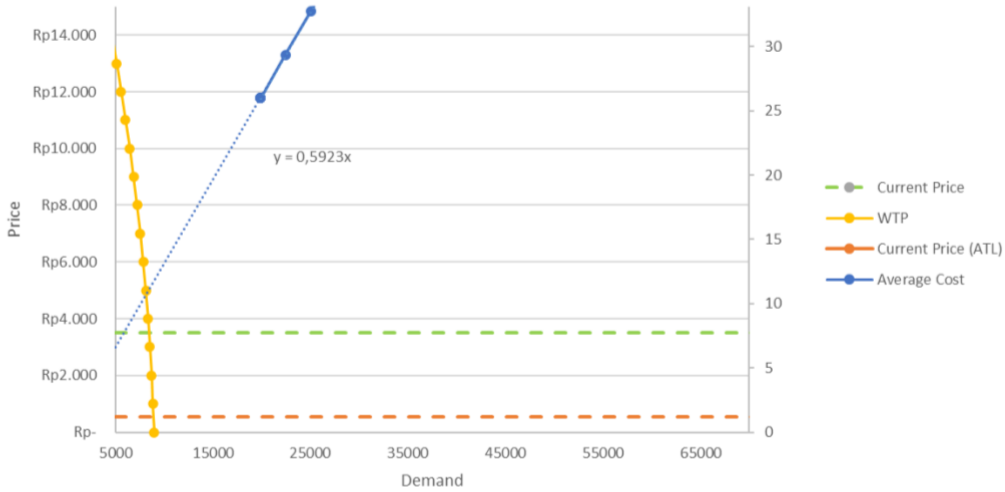

Figure 7. Subsidy Model Graph for Corridor 12

This figure presents the subsidy model for Corridor 12, similar to Figure 2. The yellow curve represents WTP, the blue curve represents Average Cost, and the orange line represents revenue per ATL. The blue-red area shows the financial deficit, highlighting the subsidy required to sustain the corridor's operations.

Table 8. Curve Functions in the Subsidy Model Graph for Corridor 12

Function	Equation/Value
f(y1) (WTP)	*Demand**((exp(2,699-0,00197y))/(1-exp(2,699-0,00197y))
f(y2) (Average *Cost*)	y/0,5923
f(x1) (Current Price (ATL))	Rp544
f(y3) (Realization of Bus Capacity)	40545

This table shows the subsidy estimation in Corridor 12. It includes functions for WTP (demand), Average Cost (supply), current price per ATL, and realized bus capacity. The formulation follows a similar approach to Corridor 5 but with different cost parameters.

Table 9. Subsidy Area Calculation in the Subsidy Model Graph for Corridor 12

Blue	
f(y3)dy	40545y+C
f(y2)dy	(y(5000y)/5923)+C
Upper Bound	Rp24.014
Lower Bound	0
f(y3)dy	Rp973.629.937,992

f(y2)dy	Rp486.789.835,336
Blue Area	Rp486.840.102,656
Red	
f(y1)dy	*Demand**100000*LN(ABS(EXP(c1+b1*y-1)))/197 +C
Demand	9607
c1	2,699
b1	-0,00197
Upper Bound	Rp544
Lower Bound	0
f(y1)dy	Rp5.224.966,352
f(y2)dy	Rp249.700,658
Red Area	Rp4.975.265,694
Corridor Subsidies	Rp481.864.836,962

This table outlines the area calculations for subsidy estimation in Corridor 12. The blue area (costs) and red area (revenues) are determined, indicating that the required subsidy for Corridor 12 amounts to Rp 481,864,836.962. The study shows that Corridor 12 requires more subsidies compared to the other analyzed corridors due to its lower revenue and higher operational costs.

5. CONCLUSION

This study highlights the financial challenges that the unchanged travel policy faces, which is inappropriate for covering the increased operating costs. Comprehensive subsidy systems were needed to increase the quality and accessibility of the service, as fuel prices, vehicle maintenance costs, labour wages, and inflation all contributed to maintaining the quality and accessibility of the service. By applying the approach to the subsidy model, the study quantitatively determines the financial differences between various Transjakarta corridors. Analysis of corridors 1, 5, and 12 reveals a significant imbalance between income and cost, with Corridor 12 requiring the most significant subsidy compared to Corridor 1 and 5. Supply and demand analysis, including payment preparation (WTP), operating costs, and implemented passenger numbers, provides valuable insights into tariff optimization strategies.

The proposed fare scheme of IDR 5,000 for BRT and Non-BRT services and IDR 2,000 for Mikrotrans, with the integrated fare cap at IDR 5,000, represents the most balanced and justifiable option based on empirical and financial considerations. The fare level is substantially below the 50% user willingness to pay (WTP) of IDR 13,714, indicating that it remains within the affordability threshold of most passengers. Sensitivity analysis further supports this configuration, showing that the IDR 5,000 fare is associated with a manageable ridership decline of only 15.25%, preserving service accessibility.

The results show that tariff adjustment can increase Transjakarta's financial stability with the target subsidies. Additionally, as an operating cost, an automatic price adjustment model for tariff levels can be implemented to ensure passenger availability at the same time. From a political perspective, this study emphasises the importance of making decisions based on data-driven public transportation subsidies. The balanced mechanism for customs adjustment, supported by state funding, is crucial for maintaining an effective, affordable, and financially viable transportation service. In the future, there is a need for further studies on the additional factors that affect the demand for public transportation and alternative revenue sources.

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