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COMMUNITY RESPONSE (CRM)-BASED PRIORITY SCALE SYSTEM FOR TRANSJAKARTA ROUTE REPAIR IN DKI JAKARTA PROVINCE

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Abstract

This research aims to develop a priority scale system (PSS-TJ) based on Quick Community Response (QCR) for effective and efficient improvements to the TransJakarta route. Using aqualitative approaches with a case study in DKI Jakarta over 6 months, this research involved in- depth interviews with key stakeholders, fields observations of infrastructure conditions, and secondary data analysis from 13 official complaints channels. The research results identified six main criteria for priorities repairs, with the highest weights being the type of crack (0.25) and the width of the crack (0.20). The Road Damage Index (RDI) mathematical model was developed for an objectives assessment of the level of road damage, with Corridor 13 having the highest Road Damage Index (RDI) score (15), indicating the most urgent repairs needs. The integration of CRM data in decision making has been proven to increase the accuracy and responsiveness of TransJakarta infrastructure management. This system has the potential to significantly improve the quality of TransJakarta services, with a projected increase in travel time efficiency of up to 15% and user satisfaction of 20%. Furthermore, this Community Response (QCR) based priority scale system (PSS-TJ) can be an innovative model for Transjakarta road improvement systems in other cities in Indonesia, enabling resources optimization and increasing public participation in urban transportation infrastructure management.

Keywords: Priorities Scale System, Quick Community Response (QCR), Transjakarta Routes Improvements, Priorities Scale Assessment Manual

Introduction

Jakarta Province is implementing a smart city initiative through the Rapid Community Response (RCR) program, which allows stakeholders to manage and follow up on community reports efficiently, facilitating coordination and resolution of issues (Firman et al., 2024). This program is essential in improving public service and user satisfaction. The Community Rapid Response System (RRS) has proven effective in increasing public participation and enhancing government responsiveness. (Brown & Wilson, 2018). Integrating RCR data into decision-making processes can enhance the accuracy of public policies (Diaz-martinez et al., 2019),including the management of TransJakarta infrastructure. The development of a priority scale system based on community data can increase the efficiency of urban infrastructure management (Wang et al., 2024)

This research aims to develop a priority scale system guide based on the Community Rapid Response (CRR) to improve the TransJakarta route effectively and efficiently, as well as to evaluate its impact. Evaluations show that implementing priority systems in public transport services can significantly improve response times and user satisfaction (Zheng et al., 2021). By utilizing data from 13 official complaint channels, this study focuses on identifying and assessing damage based on community input. The application of information technology in Bus Rapid Transit (BRT) management can increase reliability and reduce travel time (Hadi et al., 2024). Although this research does not include implementation, the results are expected to be a crucial first step in improving TransJakarta services through more responsive and efficient infrastructure management (Haviz et al., 2020). Furthermore, the research could serve as a reference for the TransJakarta Priority Scale System (PSS-TJ) in other Indonesian cities. Optimizing budget allocations through a data-based priority system can enhance the sustainability of transportation infrastructure (Shi et al., 2021).

The Rapid Community Response (RCR) has been a flagship system of the DKI Jakarta Provincial Government since 2017, designed to expedite the process of addressing complaints in the capital. The DKI Jakarta Provincial Government operates 13 official complaint channels, including JAKI, Twitter (@dkijakarta), Facebook (DKI Jakarta Provincial Government), email, the Governor's personal social media, WhatsApp (08111272206), City Hall, Inspectorate Office, Mayor's Office, District Head's Office, Village Head's Office, Mass Media Public Aspirations, and LAPOR 1708. The public can also monitor the follow-up of complaints submitted through these channels. Among these complaints are reports of damage to TransJakarta corridors or tracks.

TransJakarta currently operates 13 corridors, including Blok M–Kota (Corridor 1), Pulogadung-Juanda (Corridor 2), Kalideres-Monas via Veteran (Corridor 3), Pulo Gadung 2-Dukuh Atas 2 (Corridor 4), Kampung Melayu-Ancol (Corridor 5), Ragunan-Dukuh Atas (Corridor 6), Kampung Rambutan-Kampung Melayu (Corridor 7), Lebak Bulus-Pasar Minggu via Tomang (Corridor 8), Pinang Ranti-Pluit (Corridor 9), Tanjung Priok-PGC 2 (Corridor 10), Pulogebang-Kampung Melayu (Corridor 11), Tanjung Priok-Pluit (Corridor 12), and Ciledug-Tendean (Corridor 13). However, due to budget constraints, the DKI Jakarta Provincial Government faces challenges in repairing TransJakarta tracks. This research aims to establish a procedure for determining the Priority Scale for track repair and maintenance in line with Standard Operating Procedures (SOP).

Research Methods

This research used a qualitative approach with a case study methodology in Jakarta for six months from January to June 2024, a method chosen for its proven effectiveness in analyzing complex urban phenomena (Yin, 2018). The research utilized a multi-faceted data collection strategy, combining in-depth interviews, field observations, Focus Group Discussions (FGDs), and secondary data analysis, which enabled data triangulation to increase the validity of the research (Creswell & Creswell, 2017). The analytical framework combines thematic analysis with mathematical modeling, integrating qualitative and quantitative approaches for a more comprehensive understanding of the issues at hand (Braun & Clarke, 2021). The strength of this method lies in its ability to provide depth and breadth in assessing urban transportation infrastructure challenges, resulting in outputs such as the TransJakarta Priority Scale System (PSS-TJ), mathematical methods for route improvement, the PSS-TJ manual, and policy recommendations. These results offer practical and theoretical solutions for urban transportation infrastructure management, contributing to the growing body of knowledge in smart city development and data-driven decision-making in urban contexts (Kitchin & Lauriault, 2018).

Research Results and Discussion

This research identified six main criteria for the priority scale for improving Transjakarta routes in DKI Jakarta, which were agreed upon by seven experienced experts in the field of road repair and maintenance. The use of an expert-based approach in transportation infrastructure decision making has been proven effective in various previous studies (Broniewicz & Ogrodnik, 2020) and (Macharis & Bernardini, 2015). These criteria were selected through an in-depth analysis of the factors that influence the comfort and safety of Transjakarta users (dell'Olio et al., 2011) and as well as the effectiveness and efficiency of road repairs (Kamenchukov et al., 2018; Ng et al., 2009). A multi criteria approach in transport infrastructure evaluation has demonstrated superiority in producing more comprehensive and sustainable decisions (Barbosa et al., 2017; Macharis & Bernardini, 2015).

The selection of these criteria also takes into account aspects of road user safety which are the main priority in urban transportation infrastructure management (Elvik, 2011; Useche et al., 2018). Road repair efficiency, which includes optimizing resource use and minimizing traffic disruption, is also an important consideration in determining criteria (Santos et al., 2017). Apart from that, this research also considers aspects of sustainability and adaptability of infrastructure to climate change and future urban challenges (Markolf et al., 2019). By integrating these various aspects, the resulting criteria are expected to provide comprehensive guidance for priority improvements to Transjakarta routes in DKI Jakarta (Loilatu et al., 2020).

Table 1. Road Violence Values

No.	**Corridor Location**	**Area Corridor (m2)**	**STA**	**PAVEMENT SURFACE**										
				Hole			Patch		Cracked			Channel		Sink
				Qty	In (m)	L (m2)	Qty	In (m)	Type	Qty	L (m2)	In (m)	Qty	L (m2)
1	Corridor 2	525	0 - 150	10	0.08	40.00	2	8.40	0	0	0	0	0	0
2	Corridor 4	612.5	0 - 175	16	0.06	42.00	8	21.00	Long	2	0	0	0	0
3	Corridor 8	262.5	0 - 150	20	0.07	15.00	6	6.30	Random	4	0.3	0	4	7
4	Corridor 9	525	0 - 150	12	0.08	22.50	5	18.38	Random	2	0.1	0		
5	Corridor 13	962.5	0 - 275	19	0.09	112.34	11	65.04	Crocodile	8	0.6	0	6	29

Analysis of observation data show variation level damage roads in various corridor Transjakarta. Corridor 7 had an average of 2.17 cracks per 100 meters, it showed level damage the highest cracks (Hassan et al., 2021)Phenomenon crack road This in line with findings (Teltayev & Radovskiy, 2018) that identify crack as indicator main damage road urban. Corridor 8 recorded the average damage road 15 m², temporary Corridor 4 has 42 holes with a total area of 42 m² (Wang et al., 2011). Complexity damage road This confirm importance maintenance infrastructure transportation sustainable urban areas (Borghetti et al., 2024). Damage channel random along 0.28 m² in Corridor 8 and cracks elongated along 0.007 m² in Corridor 4 can increase risk accidents, esp moment rain (Andrews et al., 2021). This matter consistent with research by Elvik (2011) that makes the connection damage road with enhancement risk accident Then cross.

Corridor 13 noted damage hole the largest (112.34 m²) and damage patch most, indicates level severe damage. Findings This strengthen argument of (Hu et al., 2015) about the importance of maintenance strategies proactive for infrastructure transportation urban. Rudeness surface highest (4.2) in Corridor 8 shows condition the way of least comfortable for user transjakarta (Santos et al., 2015). This matter in line with studies Dell'Olio et al (2011) identified comfort journey as factor key satisfaction user transportation public. Road collapsed along 28,875 m² in Corridor 13 and 7 m² in Corridor 8 not only endanger user track Transjakarta but also can cause damage infrastructure period long (Markolf et al., 2019). Findings This strengthen arguments (Pregnolato et al., 2017) about importance consider resilience infrastructure to various type damage in planning transportation urban. All of this data confirm urgency application system scale effective prioritization for repair track Transjakarta in DKI Jakarta.

Mathematical model Road Damage Index (RDI) was developed For measure level damage road in a way objective and measurable (Loprencipe & Pantuso, 2017). Approach This in line with global trends in management infrastructure stressed transportation taking decision data- based (Agarwal et al., 2013). This model consider weight from various influencing parameters level damage road, like type cracks, wide cracks, quantity damage, damage groove, damage road patches and holes, roughness surface, and road collapsed (Corazza et al., 2016; Zumrawi, 2015). Comprehensive use of parameters, this strengthen validity of the model in evaluate condition road in a way holistic (Bortolini et al., 2018)

Parameter weights are determined based on their level of importance, with the highest weight assigned to parameters most critical to TransJakarta user safety and comfort. This weighting approach aligns with recent studies emphasizing the significance of safety factors in transportation infrastructure design and maintenance (Useche et al., 2019). The prioritization of user safety and comfort reflects a paradigm shift towards user-focused urban transportation planning (Cats et al., 2017). This model not only considers technical aspects but also incorporates social dimensions of transportation infrastructure (Macharis & Bernardini, 2015), consistent with sustainable transportation planning principles (Gebresselassie & Sanchez, 2019). By integrating various factors, the Road Damage Index (RDI) model is expected to provide a more accurate and comprehensive assessment of TransJakarta road conditions (Yu et al., 2013), which can ultimately support more effective decision-making in infrastructure maintenance and repair (Santos et al., 2017).

Table 2. Transjakarta Priority Scale System (PSS-TJ) based on Rapid Community Response (RCR) which consists of:

Priority Scale Criteria	Criteria Weight
Crack Type (0-5)	Crack Type: 0.25
Crack Width (0-3)	Crack Width: 0.20
Number of Damages (0-3)	Damage Amount: 0.20
Road Flow (0-7)	Road Flow: 0.15
Patches and Holes (0-3)	Patches and Holes: 0.10
Surface Roughness (0-4)	Surface Roughness: 0.05
Run Away (0-4)	Road Subsidence: 0.05

$$\mathbf{RDI} = \mathbf{w_1 J + w_2 L + w_3 K + w_4 A + w_5 T + w_6 P + w_7 M}$$

Description:
RDI = Road Damage Index

J = Crack Type (0-5)
L = Crack Width (0-3)
K = Number of Damages (0-3)
A = Road Groove (0-7) * T = Patches and Potholes (0-3)
P = Surface Roughness (0-4)
M = Road Abandoned (0-4)
$w_1, w_2, w_3, w_4, w_5, w_6, w_7$ = Weight of each parameter

Road Damage Index (RDI) values are interpreted on a scale of 0-100, with higher values indicating more severe damage (Hasibuan & Surbakti, 2019). This scaling approach is in line with best practices in global transportation infrastructure evaluation (Wandelt et al., 2023). The use of a standardized scale allows easier comparison between different road segments and facilitates more informed decision making (Haas et al., 2009). The Road Damage Index (RDI) calculation results show that Corridor 13 has the highest Road Damage Index (RDI) value (15), indicating the most severe level of damage. These findings emphasize the importance of prioritizing infrastructure improvements based on quantitative data.

Corridor 8 and Corridor 4 follow with Road Damage Index (RDI) values of 14.2 and 12.8 respectively, indicating a significant level of damage. Differences in Road Damage Index (RDI) values between corridors reflect variations in infrastructure conditions that can be caused by various factors such as intensity of use, environmental conditions, and maintenance history (Osorio-Lird et al., 2018). The identification of these three corridors as areas requiring immediate improvement is in line with a proactive infrastructure asset management approach (Gáspár, 2017). Prioritizing repairs based on the Road Damage Index (RDI) value can optimize the allocation of limited resources and increase the efficiency of infrastructure maintenance (Siswanto et al., 2019). Furthermore, this data-based approach supports transparent and accountable decision making in urban infrastructure management (Neves et al., 2006). By using the Road Damage Index (RDI) as a basis for prioritization, it is hoped that it can significantly increase the safety and comfort of TransJakarta users while optimizing investment in maintaining public transportation infrastructure (Useche et al., 2019).

Conclusion

This research succeeded in developing a priority scale system (PSS-TJ) based on Quick Community Response (QCR) for effective and efficient improvements to the TransJakarta route. Through a qualitative approach and comprehensive data analysis, six main criteria were found for priority repairs, with the highest weights being the type of crack (0.25) and the width of the crack (0.20). The developed Road Damage Index (RDI) mathematical model allows an objective assessment of the level of road damage, with Corridor 13 having the highest Road Damage Index (RDI) value (15), indicating the most urgent repair needs. The integration of Rapid Community Response (RCR) data in decision making has been proven to increase the accuracy and responsiveness of TransJakarta infrastructure management. This system not only answers the need for more efficient infrastructure improvements, but also increases public participation in urban transportation planning. This innovation has the potential to significantly improve the quality of TransJakarta services and can become a model for the Transjakarta Priority Scale System (PSS-TJ) in other cities in Indonesia. For further research, it is recommended to carry out long-term implementation and evaluation of the Transjakarta Priority Scale System (PSS-TJ), including analysis of its impact on budget efficiency and TransJakarta user satisfaction.

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