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Optimizing Public Digital Service Utilization through Marketing Intelligence: An SLA-Based Analysis of the Palapa Ring Network

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KEYWORDS
SLA Resolution Rate; network utilization; service response; marketing intelligence; sustainability marketing.

ABSTRACT
This study aims to analyze the impact of system responsiveness to service disruptions on the utilization rate of the Palapa Ring public digital network from a strategic marketing perspective. The focus is on operational data, particularly the number of disruptions and their resolution ratio (SLA Resolution Rate), which represent the marketing intelligence system applied in public service management. Due to the unavailability of complete technical data such as uptime and latency, this research adopts a quantitative approach using secondary data from the Palapa Ring ticketing report system for 2024–2025. Network utilization is calculated using a proxy approach based on the ratio between unresolved and resolved disruptions. Regression analysis results show that the SLA Resolution Rate significantly and positively affects network utilization, while the number of disruptions has a negative but relatively minor effect. These findings highlight the importance of efficient disruption handling as a key factor in maintaining user trust and participation in public digital services. The study contributes to the application of sustainability marketing and marketing intelligence concepts in managing national digital infrastructure, emphasizing the need for performance transparency and reporting systems as strategies to enhance digital public service adoption and accountability.

INTRODUCTION

The advancement of digital technology has driven significant transformation in public service delivery, including in the provision of digital-based network infrastructure (Abdussamad et al., 2024). One of the Indonesian government's strategic initiatives to ensure equitable access to digital services is the Palapa Ring project, which establishes a national fiber optic backbone network extending to underdeveloped, frontier, and outermost (3T) regions (Falah, 2023). This infrastructure not only supports connectivity but also serves as a medium to accelerate technology-based public service delivery (Eze, Chibuzor, Okafor, & Osita, 2024).

However, the existence of digital infrastructure does not guarantee optimal utilization. In the context of public services, the utilization of digital networks is highly dependent on the system's reliability and responsiveness to service disruptions (Das, 2024). This highlights the importance of monitoring service performance through disruption reporting systems and Service Level Agreement (SLA) measurements as part of a broader marketing intelligence system (Anny, 2025). Marketing intelligence refers to an organization’s ability to systematically collect, analyze, and utilize market information to support strategic decision-making (Lin, Hsu, & Yeh, 2015).

This study aims to analyze the impact of system responsiveness to service disruptions on the utilization rate of the Palapa Ring public digital network from a strategic marketing perspective (Saflor et al., 2024). The focus is on operational data, particularly the number of disruptions and their resolution ratio (SLA Resolution Rate), which represent the marketing intelligence system applied in public service management (Olayinka, 2021). Due to the unavailability of complete technical data such as uptime and latency, this research adopts a quantitative approach using secondary data from the Palapa Ring ticketing report system for 2024–2025. Network utilization is calculated using a proxy approach based on the ratio between unresolved and resolved disruptions (Moore, Amin, Ripplinger, Mehta, & Cheng, 2016). Regression analysis results show that the SLA Resolution Rate significantly and positively affects network utilization, while the number of disruptions has a negative but relatively minor effect (Swain & Garza, 2023). These findings highlight the importance of efficient disruption handling as a key factor in maintaining user trust and participation in public digital services (Nowak & Distel, 2024). The study contributes to the application of sustainability marketing and marketing intelligence concepts in managing national digital infrastructure, emphasizing the need for performance transparency and reporting systems as strategies to enhance digital public service adoption and accountability (Tariq, 2025).

In much of the literature, service reliability and disruption resolution efficiency are considered key components in building user trust and loyalty, which directly contribute to the sustainability of service usage (Swain & Garza, 2023). The research gap identified lies in the lack of studies that integrate marketing intelligence, sustainability marketing, and actual operational data (such as SLA ticketing data) in evaluating the utilization of public digital infrastructure (Swain & Garza, 2023). Most existing studies remain focused on technical aspects like uptime and latency, while managerial-responsiveness and user-level data are rarely emphasized.

Therefore, the objective of this study is to analyze the effect of system responsiveness to service disruptions indicated by the number of disruptions and SLA Resolution Rate on the utilization level of the Palapa Ring public digital network (Widjajarto, Lubis, & Lubis, 2024). This approach not only contributes to academic literature related to digital public service strategy but also provides a policy foundation for strengthening data-driven management of national digital infrastructure (Van Ooijen, Ubaldi, & Welby, 2019).

The strategic utilization of public digital infrastructure such as the Palapa Ring can be effectively analyzed through the integration of several theoretical frameworks (Ikhsanti, Arnezti, & Alika, 2025). The Market-Driven Theory emphasizes the importance of organizational responsiveness to market signals and customer needs, where marketing intelligence plays a pivotal role in capturing service performance gaps (Soykoth, Sim, & Frederick, 2025). In parallel, the SERVQUAL model introduces dimensions of service quality particularly reliability and responsiveness which are directly aligned with operational metrics such as the frequency of disruptions and SLA Resolution Rate (Liu, Sucala, Luis, & Soliman Khaled, 2025). Furthermore, the Resource-Based View (RBV) underscores the strategic significance of public infrastructure as an organizational asset, with service responsiveness reflecting the capability to manage and leverage such resources efficiently (Pandisha, Kombe, & Kayunze, 2024). Lastly, Sustainability Marketing Theory advocates for long-term, trust-

based adoption of services, positioning SLA effectiveness as a critical driver of user confidence and the sustainable use of digital public platforms (Mähönen, 2023). The convergence of these theories provides a robust foundation for evaluating how system responsiveness and strategic communication influence the adoption and utilization of national digital infrastructure (Oughton et al., 2018).

METHOD

This study employs a quantitative explanatory approach to analyze the relationship between system responses to service disruptions and the estimated utilization of the Palapa Ring public digital infrastructure. The research focuses on the disruption response variable (X2), due to limited access to detailed technical data such as uptime and latency (X1).

Secondary data were obtained from the Palapa Ring SLA performance reports (2024–2025) and the disruption/ticketing reporting system. Main data sources include:

a. Monthly disruption count (case category);
b. Disruption resolutions (clear alarm category).

Estimated network utilization (Y) is calculated using a proxy formula:

$$Utilizationproxy = (1 - Unresolved\ DisruptionsTotal\ Disruptions) \times 100 Utilization_{proxy} = \left(1 - \frac{\text{Unresolved Disruptions}}{\text{Total Disruptions}}\right) \times 100$$

This formula assumes that the fewer the unresolved disruptions, the higher the network's effectiveness and user utilization.

The unit of analysis is monthly data (May 2024 – April 2025), covering 12 observation periods. Each observation point represents one month of cumulative ticketing reports from Palapa Ring.

Research Variables and Operational Definitions

Table 1. Operational Definition of Research Variables

Variable	Code	Indicator	Data Source
Disruption Response	X1	Monthly disruption count	Palapa Ring Ticketing (Excel)
SLA Resolution Rate	X2	Clear alarm ÷ Total disruptions × 100	Palapa Ring Ticketing (Excel)
Estimated Utilization	Y	1 - (Unresolved Disruptions ÷ Total Disruptions)	Derived from X1 and X2

Source: Secondary data processed from Palapa Ring's SLA Performance Report (2024-2025)

Research Hypotheses

H1: There is a significant simultaneous effect of the number of disruptions and the SLA Resolution Rate on network utilization (proxy) in the Palapa Ring project (2024–2025).
H2: The number of disruptions negatively affects network utilization (proxy).
H3: The SLA Resolution Rate positively affects network utilization (proxy).

Data Analysis Techniques

The analysis involves two stages:

a. **Descriptive Statistics**: Displaying monthly trends in disruptions, resolutions, and proxy utilization.
b. **Simple and Multiple Linear Regression**:
   Model 1: Effect of Disruption Count on Proxy Utilization;
   Model 2: Effect of SLA Resolution Rate on Proxy Utilization;
   Model 3: Simultaneous Effect of Both Variables on Proxy Utilization.

Statistical tests include:

a. Classical assumption tests (normality, multicollinearity);
b. Parameter significance tests (t-test) and simultaneous test (F-test);
c. Coefficient of determination (R^2).

Limitations

This study does not include technical variables (X1) such as uptime, latency, or downtime due to unstructured availability across time or nodes. Therefore, the model only captures the effect of system response (X2) on utilization.

RESULTS AND DISCUSSION

Descriptive Statistics

Based on Palapa Ring ticketing data from May 2024 to April 2025, the average monthly disruption count was 106, while the average resolved disruptions (clear alarms) were 60. Proxy utilization was calculated using:

$$Utilization_{proxy} = \left(1 - \frac{\text{Disruptions} - \text{Clear Alarms}}{\text{Disruptions}}\right) \times 100$$

Monthly proxy utilization ranged from 25% to 70%, depending on disruption resolution efficiency.

Table 2. Descriptive Statistics on the Performance and Utilization of the Palapa Ring Network (May 2024 - April 2025)

Month	Disruptions	Clear Alarms	SLA Rate (%)	Proxy Utilization (%)
May 2024	96	16	16.67	16.67
June 2024	126	70	55.56	55.56
July 2024	118	75	63.56	63.56
August 2024	149	69	46.31	46.31
December 2024	128	71	55.47	55.47

Source: Secondary data processed from the Palapa Ring Ticketing System (2024-2025)

Regression Results

a. **Model 1**: Regression shows a negative coefficient (-1.94e-16, p = 0.033), indicating that more disruptions slightly decrease proxy utilization.

b. **Model 2**: SLA Resolution Rate has a strong positive effect (coefficient = 1.0000, $p < 0.0001$), indicating a 1% increase in SLA Rate results in a 1% rise in proxy utilization.
c. **Model 3**: The multiple regression yields $R^2 = 1.000$ with F-statistic = 5.73e+31 and Prob(F) < 0.0001, mathematically confirming perfect correlation due to the derived nature of the proxy variable.

The study finds that system response, especially the SLA Resolution Rate, significantly influences network utilization. Higher disruptions reduce utilization, while efficient resolutions increase it. However, the perfect R^2 suggests mathematical dependency between the variables, warranting careful interpretation. Future studies should include variables like actual traffic, capacity usage, user counts, and user perception.

These findings align with marketing theories:

a. **Marketing Intelligence**: Real-time disruption reporting and resolution efficacy as performance evaluation tools.
b. **SERVQUAL**: Disruption frequency reflects reliability; resolution reflects responsiveness.
c. **Sustainability Marketing**: High SLA and quick responses build user trust and long-term adoption.

These findings carry important strategic implications. For the National Digital Policy (Kemenkominfo), the results of the study confirm the need to shift the focus from just the expansion of physical infrastructure to strengthening performance monitoring systems and rapid response capabilities. The SLA Resolution Level should be integrated as a Key Performance Indicator (KPI) in the evaluation of national broadband strategies. In the context of the Regional Adoption Challenge, wide utilization fluctuations reflect disparities in maintenance and technical support capabilities, particularly in the 3T region, which require targeted interventions. In the end, all of these things come down to Building Public Trust. The strong relationship between disruption resolution and utilization confirms the principle of Market-Driven Theory that organizational responsiveness to market signals—in this case, service disruption—is the foundation for continued trust and adoption of public digital services.

This study recommends enhancing disruption reporting systems, integrating them into public dashboards, and enriching data with real traffic and user perceptions. The SLA Resolution Rate should be a key performance indicator (KPI) in public digital infrastructure management.

CONCLUSION

The study concludes that the SLA Resolution Rate significantly influences Palapa Ring's public network utilization, with the quality of disruption response being more impactful than the frequency of disruptions. The perfect statistical fit ($R^2 = 1.000$) underscores the strong interdependence of these variables, highlighting the essential role of marketing intelligence and sustainability marketing in managing national digital services. To enhance Palapa Ring's performance, strategies including real-time monitoring, transparent SLA indicators, public dashboards, expanded evaluation metrics (usage, traffic, customer perception), SLA as a strategic KPI in management, and promoting digital literacy are recommended to sustain user-centric service quality. Future research could explore integrating user experience metrics and

advanced predictive analytics to further optimize digital service delivery and infrastructure resilience in similar large-scale public digital networks. This direction would deepen understanding of user behavior patterns and proactive disruption management to elevate public digital service adoption sustainably.

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