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TRANSFORMING CUSTOMER COMPLAINTS INTO OPERATIONAL INSIGHT IN AFTERSALES SERVICE OPERATIONS

Hamdan Amaruddin[1*], Miftahul Huda[2], Kurbandi Satpatmantyo B.R[3], Erdi[4], Fathurrohman[5]

[1-5]Management/ Economics and Business, Universitas Pelita Bangsa, Indonesia

[*]Email corresponding author: hamdanamar@pelitabangsa.ac.id

Abstract

The rapid growth of digital transformation has encouraged organizations to utilize operational data as a strategic asset for service improvement and decision support. In aftersales service operations, customer complaint data contains valuable information that can support service quality enhancement, operational responsiveness, and customer experience improvement. This study aims to explore the implementation of digital customer complaint intelligence using historical complaint data collected from aftersales service activities over a 29-month period. The dataset consists of various complaint categories, spare part types, product models, and customer segments. Using a data-driven analytical approach, this study identifies complaint patterns, dominant service issues, temporal trends, and operational insights that may support managerial decision-making processes. The findings indicate that customer complaint data can function not only as a reactive service record but also as a strategic digital intelligence resource for preventive action and operational performance improvement. This research contributes to the growing discussion on digital service analytics and provides practical implications for organizations seeking to strengthen aftersales service effectiveness through data-driven approaches.

Keywords: Digital Complaint Analytics, Customer Complaint Intelligence, Aftersales Service operation, Operational Intelligent, Data-Driven Decision Making

INTRODUCTION

Digital transformation has significantly changed the way organizations manage operational and customer-related information (Oduro et al., 2023). Companies are increasingly utilizing digital technologies and data analytics to support decision-making processes, improve operational responsiveness, and enhance customer satisfaction (Mydity et al, 2023; Khare et al 2023). In service-oriented industries, customer complaint data has become one of the important sources of operational intelligence because it reflects actual customer experiences and operational issues occurring in the field.

Aftersales service operations play a crucial role in maintaining customer trust and product reliability. The effectiveness of aftersales service not only influences customer satisfaction but also contributes to long-term business sustainability and competitive advantage. However, many organizations still utilize customer complaint data merely as administrative records instead of strategic information for operational improvement.

The increasing availability of historical complaint data creates opportunities for organizations to implement digital complaint intelligence systems. Through a data-driven approach, customer complaints can be transformed into operational insights that support preventive actions, service improvement strategies, and decision support systems (Midity et al. 2023, Kim, 2023) .This approach is aligned with the growing trend of digital service analytics and intelligent service management in the industry 4.0 era.

Several previous studies have discussed customer satisfaction, service quality, and complaint handling systems. However, limited studies have focused on utilizing historical complaint data as digital intelligence for aftersales service operations, particularly in developing countries. Therefore, this study aims to analyze customer complaint data collected from aftersales service activities and examine its potential contribution to operational decision support and service improvement.

This research is expected to contribute theoretically to the development of digital service analytics literature and practically to organizations seeking to strengthen operational effectiveness through data-driven aftersales service management.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Digital Transformation in Service Operations

Digital transformation refers to the integration of digital technologies into organizational activities to improve operational efficiency, responsiveness, and customer value creation. In service operations, digital transformation enables organizations to collect, process, and analyze large volumes of operational data to support strategic and operational decisions (Wei, et al. 2023).

The development of digital technologies has encouraged companies to adopt data-driven operational management. Customer interaction records, service logs, and complaint databases are increasingly recognized as valuable organizational assets that can provide operational insights and support continuous improvement (Sequeira, et al. 2023)

Customer Complaint Intelligence

Customer complaints contain important information related to product failures, service delays, operational bottlenecks, and customer expectations (Pedrosa, et al. 2023). Traditionally, complaints were treated as reactive administrative reports. However, recent developments in digital analytics have shifted organizational perspectives toward utilizing complaint data as customer intelligence.

Customer complaint intelligence refers to the process of transforming complaint data into actionable insights for operational improvement and strategic decision-making. This concept emphasizes the role of digital analytics in identifying complaint patterns, detecting recurring issues, and supporting preventive service actions (Lemke et al., 2024, Alyahya et al., 2026).

Aftersales Service Operations

Aftersales service operations involve activities conducted after product delivery, including maintenance, repair, spare part replacement, warranty handling, and customer support services. Effective aftersales service management contributes to customer retention, brand reputation, and operational performance (Hsieh, 2022).

The increasing complexity of products and customer expectations requires organizations to improve service responsiveness and operational coordination. Therefore, the utilization of digital analytics in aftersales service operations becomes increasingly important to support faster and more accurate decision-making (Khare et al. 2023].

RESEARCH METHODS

Research Design

This study employs a quantitative descriptive approach using historical operational data obtained from aftersales service activities. The research focuses on the analysis of customer complaint data as a form of digital operational intelligence.

Data Collection

The dataset used in this study consists of customer complaint records collected over a period of 28 months. The complaint database includes information related to; complaint categories, spare

part types, product models, customer categories, complaint frequency and complaint occurrence period. The data were obtained from the company's aftersales service operational records.

Data Analysis

This study applies a data-driven analytical approach to identify operational insights from customer complaint data. The analysis includes: complaint trend analysis, identification of dominant complaint categories, product model complaint mapping, spare part issue identification, customer complaint distribution analysis, and temporal pattern analysis. The analytical results are used to evaluate the potential implementation of digital complaint intelligence for operational decision support.

RESULTS AND DISCUSSION

Overall Complaint Trend Analysis

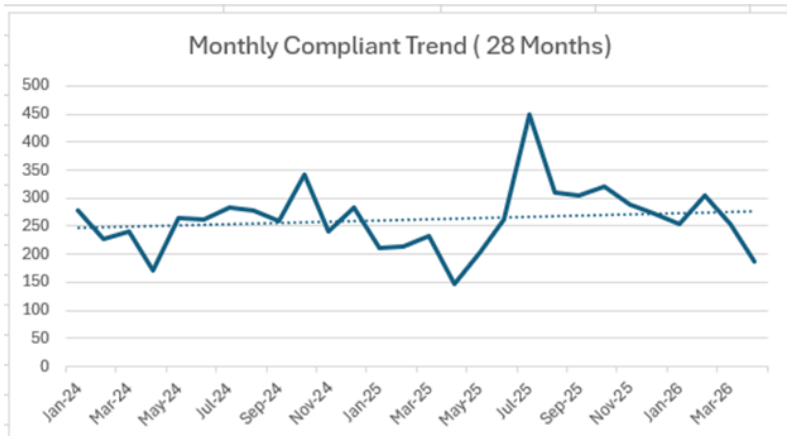

Figure 1. Monthly Complaint Trend During the Observation Period

Figure 1 shows the monthly complaint trend during the 28-month observation period. The results indicate a fluctuating pattern with an overall positive trend. Several escalation periods were observed, particularly during mid-2025, suggesting increasing operational pressure within aftersales service activities.

Trend decomposition analysis revealed that the escalation was distributed across multiple spare part categories rather than being driven by a specific spare part.

Complaint Concentration Analysis

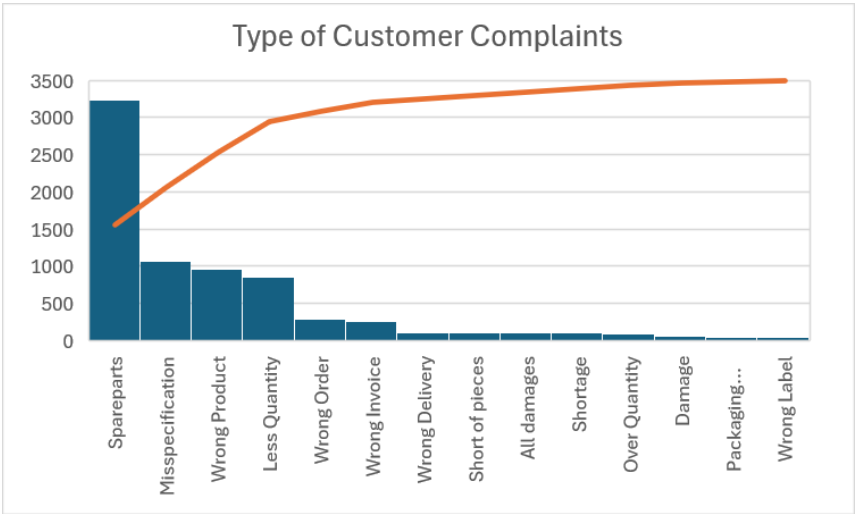

Figure 2. Pareto Analysis of Complaint Categories

Pareto analysis reveals that damaged spare parts, wrong physical items, mis product, and insufficient quantity represent the dominant complaint categories. These categories account for the majority of recorded complaints and indicate recurring operational issues within aftersales service fulfilment processes.

These findings suggest that complaint data can support organizations in identifying operational vulnerabilities and prioritizing service improvement initiatives. Instead of relying solely on reactive complaint handling, organizations may utilize complaint intelligence to support preventive operational strategies (Goedhart et al., 2023).

High-Risk Spare Part Identification

Table 1. Top 15 Complaint-Contributing Spare Parts

Rank	Code	Spare part	Complaint
1	SP1	Clutch Cover	16
2	SP2	Glass Window	15
3	SP3	Coil Assy, Ignition (gray)	14
4	SP4	Head Assy, Cylinder	13
5	SP5	Bearing	12
6	SP6	Hose fuel	12
7	SP7	Cylinder Comp A	12
8	SP8	O ring	11
9	SP11	Seal Valve Steam Oil	9
10	SP12	Spark Plug	9

The analyses identified several spare parts that consistently generated high complaint frequencies. These spare parts were selected for further pattern analysis using heatmap visualization.

Heatmap-Based Complaint Pattern Analysis

	Type of Complaints			
Spare part	Damages	Misspesification	Mis Product	Less Quantity
SP1	7	0	10	1
SP2	15	0	0	0
SP3	1	2	4	5
SP4	8	4	0	0
SP5	10	0	0	2
SP6	0	0	1	10
SP7	0	12	0	0
SP8	3	2	1	3
SP9	1	1	0	6
SP10	6	0	2	1

Figure 3. Heatmap of Complaint Distribution Across Critical Spare Parts

Heatmap visualization demonstrates that complaint intensity is unevenly distributed across spare part categories and complaint types. Several spare parts exhibits concentrate complaints

pattern, while others display multiple complaint categories simultaneously. These findings indicated the existences of both specific and systemic operational vulnerabilities.

Operational Intelligence Interpretation

Unlike the initial assumption that complaint spikes were caused by a limited number of critical spare parts, the decomposition analysis revealed that complaint escalation occurred across various spare part categories simultaneously [7]. This finding suggests the existence of system-wide operational pressures affecting aftersales service performance (Khare et al. 2023).

Managerial Implication

Organizations should develop integrated digital complaint management systems that enable real-time monitoring and analytical processing of customer complaints (Sequeira et al., 2023). The integration of historical complaint databases with operational decision support systems may improve service effectiveness and operational efficiency. Such systems may enhance value creation through improved service responsiveness and operational decision support (Kim, 2023).

Managers are encouraged to view complaint data not merely as service reports but as strategic operational intelligence that can contribute to long-term service improvement and customer satisfaction.

CONCLUSION

This study demonstrates that customer complaint data collected from aftersales service operations contains valuable operational intelligence that can support digital decision-making processes. Historical complaint records may provide important insights regarding recurring service issues, spare part problems, customer behavior patterns, and operational vulnerabilities.

The implementation of digital customer complaint intelligence enables organizations to move beyond reactive complaint handling toward data-driven operational improvement. This approach supports the broader digital transformation agenda in service operations and contributes to the development of intelligent aftersales service management.

This study contributes to the literature on digital service analytics and offers practical implications for organizations seeking to improve operational responsiveness and customer experience through data-driven approaches.

Future studies may integrate predictive analytics, machine learning techniques, or real-time monitoring systems to strengthen digital complaint intelligence capabilities.

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