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The Effect of Cash on Delivery (COD) System on Return Rates: A Case Study on SPX Shopee Agents in Binjai

Pipit Haryani[1], Elida Elfi Barus[2]

[1,2] Institut Syekh Abdul Halim Hasan Binjai, Sumatera Utara, Indonesia

E-mail Address: pipitharyani@insan.ac.id[1], elidaelfibarus@insan.ac.id[2]

Abstract

The Cash on Delivery (COD) payment system serves as a primary pillar in Indonesia's e-commerce ecosystem, designed to bridge the trust gap between sellers and buyers. However, this flexibility often correlates with elevated goods return rates that significantly burden downstream logistical operations. This study aims to analyze the influence of the COD system on the rate of goods returns, employing a specific case study at SPX Express agents in Binjai City, North Sumatra. Using a descriptive quantitative approach, primary data were collected through observation, in-depth interviews, and questionnaires administered to 100 Shopee users in Binjai who had actively utilized the COD feature. Secondary data were gathered from internal agent reports regarding failed delivery statuses. Simple linear regression analysis revealed that the COD system exerts a positive and significant influence on goods return rates. The dominant triggering factors include irresponsible consumer behavior—such as unilateral cancellations and unprepared cash funds—inaccurate addresses, and courier communication constraints, collectively accounting for 80% of return incidents. The findings indicate that while COD effectively drives transaction volume among digitally underserved populations, its logistical sustainability depends heavily on strengthened platform validation algorithms, stricter sanctions for feature abuse, and targeted consumer digital literacy programs. This study contributes to logistics management literature by addressing the underexplored operational impacts of COD at the sub-urban agent level and offers practical recommendations for platform managers, logistics agents, and policymakers to optimize COD implementation without compromising operational efficiency.

Keywords: Cash on Delivery, Goods Return, E-commerce Logistics.

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INTRODUCTION

The massive digital transformation in Indonesia has positioned the e-commerce sector as the primary driver of the national economy, with Shopee emerging as the dominant platform through 145.1 million visits by the end of 2024 (Ahdiat, 2024). Indonesia holds a strategic position as the largest digital market in Southeast Asia, with digital economy value reaching 49% of the region's total digital economy (Ilyas et al., 2020). This growth is driven by three main positive trends: increased smartphone usage, growth in mobile marketing, and massive e-commerce expansion (Ilyas et al., 2020). The COVID-19 pandemic further accelerated this transformation, as e-commerce experienced extraordinary growth worldwide when people widely shifted to online purchases (Gan, 2022). Consequently, the e-commerce payment landscape has evolved significantly, with digital payment penetration increasing from 26.48% in 2017 to 69.72% in 2023 (Abdillah et al., 2023).

Amidst this digital payment expansion, the Cash on Delivery (COD) payment system remains a dominant choice for more than 30% of users in Indonesia (Fitri et al., 2024; Misbach & Gimin, 2026; Surya et al., 2025). According to Indonesian Central Bureau of Statistics (BPS) data, COD was the most frequently used method, reaching 73.04% of all e-commerce transactions (Ramadhani et al., 2022). This phenomenon is particularly visible in regions with developing digital banking adaptation characteristics, such as Binjai City in North Sumatra. As a strategic satellite city, Binjai serves as a crucial distribution point for Shopee Express (SPX) logistics services, where the COD system often acts as a bridge for communities to transact with a sense of security (Safitri & Dafit, 2025). The dominance of COD is driven by the need for physical verification of goods, with approximately 65% of respondents in Binjai stating that their primary reason for choosing COD is to ensure the physical product arrives before they disburse cash.

However, the popularity of COD brings complex logistical consequences, particularly related to the phenomenon of goods returns. Theoretically, COD is designed to mitigate buyer risk through a "pay on the spot" mechanism, yet in practice, this convenience is frequently abused (Safitri & Dafit, 2025). At the local level, SPX agents in Binjai face daily challenges in the form of accumulated packages that fail to be delivered or are rejected by buyers without valid reasons (Safitri et al., 2025). This uncertainty creates a significant operational burden for couriers and agents, ranging from extra fuel costs for redelivery to the risk of goods damage during the return process.

The research gap in this context is evident in the focus of previous studies, which mostly examined the influence of COD on purchase interest or consumer purchase

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decisions (Sintia et al., 2024). According to the Theory of Reasoned Action, consumer perception of the ease of returns in the COD system lowers their risk threshold for making impulsive purchases (Fishbein & Ajzen, 1975). Because no funds are held in advance, consumers feel their burden of loss is zero when making returns, ignoring the logistical cost burden borne by sellers and couriers Safitri et al., 2025). Still, very few literatures deeply dissect the impact of this system on downstream logistics performance, particularly at the delivery agent level in sub-urban areas like Binjai.

Furthermore, the ethical and digital literacy aspects of consumers in using the COD feature are often overlooked in formal logistics management analyses. Low digital literacy frequently leads to moral hazard behavior, where consumers feel they have no contractual responsibility for orders they have placed (Permana et al., 2023). From a sharia economic perspective, transactions must be based on principles of justice and transparency to avoid *gharar* (uncertainty) and *dharar* (harm to one party) (Barus et al., 2025). Unilateral return practices in the COD system often cause *dharar* for couriers whose performance is measured by success rate and for sellers whose capital is tied up in returned goods (Barus et al., 2025). This deficit of moral responsibility reflects a broader issue of digital citizenship competency among e-commerce users in developing regions.

This study aims to fill these gaps by comprehensively analyzing how the COD system contributes to the rate of goods returns at SPX Shopee Agent Binjai. Using a deductive approach, the analysis will begin from the macro picture of the national e-commerce industry and narrow down to the micro dynamics of agent operations in Binjai. The final objective is to provide data-based recommendations for platform managers and logistics agents in optimizing the COD feature without sacrificing operational efficiency. Through the integration of sharia economic perspectives and financial literacy developed by local scholars such as Elida Elfi Barus, this study also attempts to formulate more targeted consumer education strategies to build a healthier transaction ecosystem in North Sumatra (Barus et al., 2025).

The practical implications of this research suggest the implementation of stricter sanctions for users who abuse the COD feature to maintain the operational sustainability of logistics agents at the local level. Additionally, platform algorithms should be tightened for COD buyer validation, and appointment-based delivery systems should be integrated to ensure buyer presence when couriers arrive. Ultimately, this study concludes that although COD increases transaction volume, its effectiveness in suppressing logistical losses depends heavily on strengthening platform regulations and consumer digital literacy. Government and academic institutions in Binjai must continue to promote digital

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literacy programs that focus not only on how to use applications but also on the ethics and legal consequences of every electronic transaction.

This study employed a quantitative approach with descriptive correlational design to measure the degree of relationship between the Cash on Delivery (COD) Payment System variable (X) and the Goods Return Rate variable (Y). The research was conducted at SPX Shopee Agent Binjai, strategically located in East Binjai, an area recording high COD transaction volume in North Sumatra. The population comprised all active Shopee application users in Binjai City who had used the COD feature within the past year. Given the extremely large and unknown population size, sample determination used non-probability purposive sampling technique with criteria: individuals who had conducted COD transactions at least three times and made returns at least once. The sample size was set at 100 respondents to meet minimum statistical analysis requirements for social research. Primary data collection was conducted through online and offline questionnaire distribution using a 1–5 Likert scale to measure respondent perceptions regarding security, privacy, and trust indicators in the COD system, as well as the frequency and reasons for their returns. Field observations were also conducted to examine return package handling procedures at the Binjai agent warehouse, from courier receipt to data input of failed deliveries into the Shopee system. In-depth interviews with agent management were conducted to understand technical obstacles frequently causing packages to be returned to sellers.

Data analysis was carried out through several systematic stages. First, validity and reliability tests of research instruments were conducted to ensure questionnaire items were consistent and accurate in measuring variables. Second, descriptive analysis was performed to describe respondent characteristics and response distributions. Third, classical assumption tests were conducted as prerequisites for simple linear regression analysis. The research hypothesis was tested using simple linear regression formula: $Y = a + bX + e$, where Y is the Goods Return Rate variable, a is the constant, b is the regression coefficient, X is the COD Payment System, and e is the standard error. Significance of influence was measured through t-test with criteria tcount > ttable. The researcher also conducted qualitative analysis of subjective return reasons to provide deeper interpretation in the discussion section. Secondary data were collected from internal agent reports regarding failed delivery status and package rejection reasons recorded in the SPX system, complementing primary data to strengthen research findings.

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Characteristics of COD System Users in Binjai

The demographic profile of 100 respondents in Binjai City reveals distinctive patterns in COD usage behavior. Approximately 65% of respondents stated that their primary reason for choosing COD was to ensure physical product verification before cash disbursement. This finding aligns with national data indicating that 73% of respondents choose COD due to in-place product verification motives (Hardianti et al., 2022). However, an interesting finding emerges regarding digital literacy among users in Binjai. As emphasized in Barus's et al (2025) study, digital literacy among young generations in North Sumatra still requires improvement, particularly in understanding payment mechanisms and transaction transparency management.

The distribution of COD usage reasons demonstrates clear behavioral segmentation among Binjai consumers. Table 1 presents the comprehensive breakdown of respondent motivations for selecting COD as their preferred payment method. Security concerns dominate user preferences, with 75% cumulative motivation related to psychological safety factors. The remaining 25% reflects structural limitations in digital banking infrastructure. This pattern suggests that COD in Binjai creates unique dynamics where couriers often function as "walking cashiers" while simultaneously acting as "conflict mediators" when delivered goods fail to meet buyer expectations.

Table 1. Distribution of COD Usage Reasons Among Respondents in Binjai

Reason Indicator	Frequency	Percentage (%)
Physical Product Security (Check First)	65	65%
Limited Digital Banking Access	20	20%
Avoiding Online Fraud Risk	10	10%
Ease of Checkout Process (No Balance Required)	5	5%
Total	**100**	**100%**

Source: Processed Primary Data (2024).

The data in Table 1 illustrates that although digital banking access limitations (20%) constitute a factor, psychological security motives (75% cumulative) serve as the primary driver. This finding resonates with Ramadhani et al. (2022), who documented that Gorontalo recorded the highest COD usage at 93.48%, indicating that regions with limited

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banking infrastructure exhibit even greater COD dependency. Furthermore, the "COD Check First" feature enables buyers to examine package contents before payment, an innovation that, while increasing purchase intention, does not significantly enhance long-term platform trust (Jaya & Abror, 2025). The implications for logistics operations are substantial, as this verification process extends delivery time and increases courier workload.

The relationship between digital literacy and COD abuse patterns warrants deeper examination. According to Permana et al. (2023), irresponsible technology usage leads to data misuse, misinformation spread, and online violence. In the e-commerce context, this translates to consumers feeling protected by anonymity and lack of accountability when rejecting COD packages. Adhari et al. (2024) emphasize that strengthening digital citizenship competency serves as defense against negative impacts of digital technology usage. For Binjai's context, this means consumers require education not merely on application operation but on contractual obligations inherent in digital transactions.

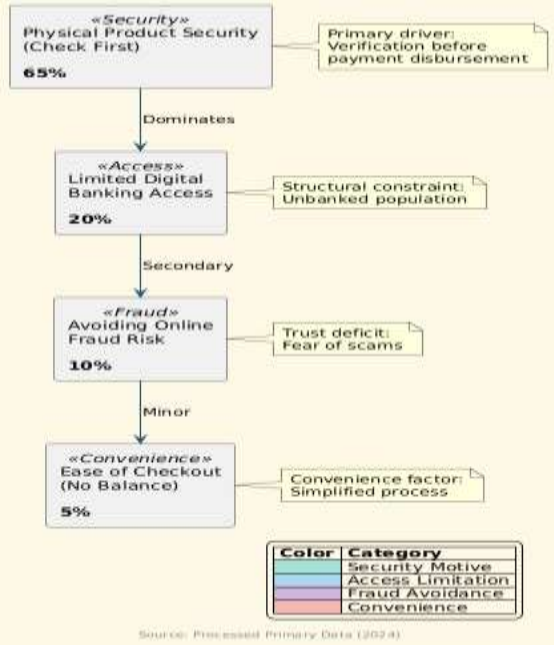


Figure 1: COD Usage Motivation Distribution in Binjai

Figure 1 visualizes the hierarchical structure of COD usage motivations among Binjai respondents. The dominant security motive (65%, green segment) reflects a

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fundamental trust deficit in digital payment systems, while the access limitation category (20%, blue segment) represents structural economic barriers. This distribution pattern supports Bustaman et al.'s (2023) argument that COD explicitly aims to enhance competitiveness and reach broader markets, particularly targeting unbanked consumers. The relatively small convenience factor (5%, pink segment) suggests that users prioritize risk mitigation over transactional ease. For logistics agents, this motivation structure implies that most returns stem not from product dissatisfaction but from systemic trust issues in digital financial infrastructure.

Analysis of Goods Return Rates at SPX Agent Binjai

The goods return rate for COD services in Binjai demonstrates significant fluctuation, particularly during major promotional periods such as double-date campaigns. Based on internal agent data, approximately 12–15% of total daily COD packages end with failed delivery or return status. This figure substantially exceeds non-COD packages (prepaid payments), which record return rates below 3%. The primary issues reported by agents include unreachable buyers and package rejection at delivery points (Safitri et al., 2025). These operational challenges create cascading effects throughout the logistics chain, from fuel cost accumulation to warehouse space inefficiency.

The classification of return causes reveals critical insights into consumer behavior patterns. Table 2 presents the comprehensive categorization of factors triggering goods returns at SPX Binjai. Buyer-related factors overwhelmingly dominate the return landscape, accounting for 80% of all return incidents. This concentration suggests that operational interventions targeting consumer behavior could yield substantial improvements. The technical factors category, while smaller, indicates areas where logistics service quality directly impacts return probability.

Table 2. Classification of Goods Return Causes at SPX Binjai

Cause Category	Sub-Category	Percentage (%)
Buyer Factors	Incomplete/Unclear Address	25%
	Buyer Not Present & Difficult to Contact	35%
	Buyer Rejects Package (Unilateral Cancellation)	20%
Technical Factors	Package Damaged During Transit	5%
	Delivery Delayed (Beyond Estimate)	10%
Others	Area Unreachable/Wrong Address	5%

Source: Processed from SPX Binjai Agent Internal Reports.

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Data in Table 2 demonstrates that 80% of return causes originate from buyer factors. The "Buyer Not Present" phenomenon (35%) frequently occurs because couriers arrive during working hours when buyers have not arranged cash handover to other household members. This pattern indicates financial and logistical unpreparedness on the consumer side when placing COD orders. Additionally, unilateral package rejection (20%) is often based on subjective reasons such as "changed mind" or "product does not match expectations" before package opening, which legally violates the *pacta sunt servanda* principle in civil law yet is frequently tolerated by platform systems for customer satisfaction (Lumaris, 2021).

The disparity between COD and non-COD return rates merits theoretical examination through the Theory of Reasoned Action framework. Fishbein & Ajzen (1975) posit that behavioral intention is influenced by attitudes toward behavior and subjective norms. In COD transactions, consumer perception of zero financial risk—since no funds are committed upfront—erodes the psychological contract binding buyers to their purchase decisions. This mechanism explains why COD return rates (12–15%) quadruple those of prepaid transactions (<3%). The perceived behavioral control element in TPB manifests differently across payment methods, with COD users experiencing diminished sense of obligation.

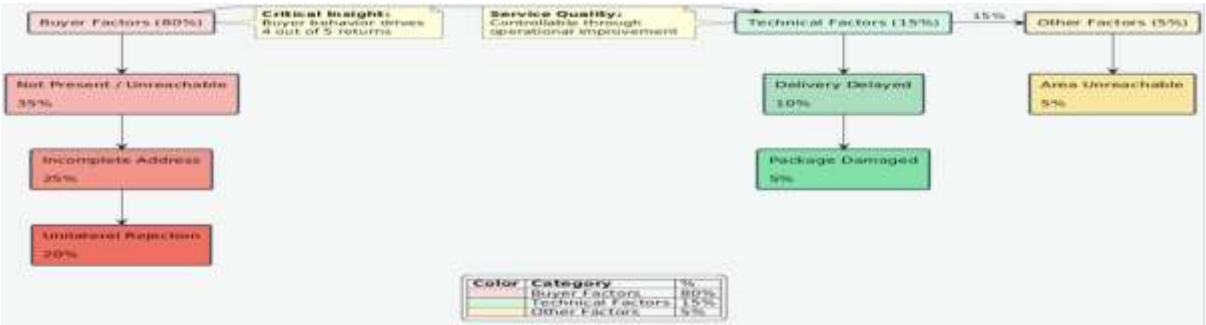


Figure 2: Goods Return Cause Classification at SPX Binjai

Figure 2 illustrates the disproportionate burden of buyer-related factors in the return ecosystem. The red-dominated visualization (80% buyer factors) starkly contrasts with the green technical segment (15%), highlighting where intervention efforts should concentrate. This distribution pattern validates Safitri et al.'s (2025) finding that poor COD implementation correlates directly with increasing payment problems and return figures. For agent management, the diagram suggests that addressing buyer preparedness—

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through confirmation calls and delivery scheduling—could potentially eliminate the majority of return incidents. The small but significant technical factor segment (15%) indicates that maintaining service quality standards remains essential for comprehensive return reduction.

Influence of COD System on Return Rates: Statistical Analysis

Simple linear regression analysis shows that the Cash on Delivery (COD) payment system has a positive and significant effect on goods return rates, indicated by a strong correlation coefficient and supported by t-test results (tcount > ttable), confirming that the relationship is statistically robust. The regression model (Y = a + bX + e) suggests that increasing exposure to COD transactions without strict buyer validation raises the probability of returns. This phenomenon can be explained through the Theory of Reasoned Action, where consumers perceive lower risk due to the absence of upfront payment, encouraging impulsive purchases and diminishing their sense of potential loss, while shifting logistical burdens to sellers and couriers. This finding aligns with previous studies highlighting that weak COD implementation contributes to higher return rates and payment issues, reflecting a gap in business ethics among some e-commerce users. From a sharia economic perspective, transactions should uphold justice and transparency to avoid *Gharar* (uncertainty) and *Dharar (*harm), as unilateral return practices often disadvantage couriers and sellers. Therefore, mitigation efforts should adopt a maqashid-oriented approach, particularly *Hifz al-Mal*, ensuring protection of assets from arbitrary consumer behavior.

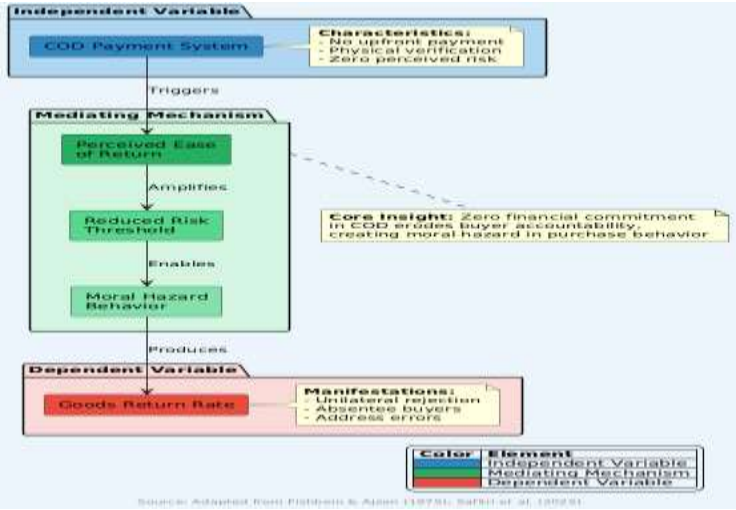


Figure 3: Conceptual Framework of COD-Return Relationship

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Figure 3 presents the conceptual mechanism linking COD system characteristics to elevated return rates through the Theory of Reasoned Action lens. The blue independent variable (COD) triggers the green mediating mechanisms (perceived ease of return, reduced risk threshold, moral hazard behavior), which collectively produce the red dependent variable (goods return rate). This causal chain illustrates why structural features of COD—particularly the absence of upfront payment—fundamentally alter consumer psychology. The visualization supports Barus et al.'s (2021) argument that fintech effectiveness depends on collaborative education and promotion among stakeholders, suggesting that platform interventions must address both system design and user mindset.

Logistical and Operational Impacts on Local Agents

The impact of returns at SPX Binjai extends beyond financial dimensions to encompass physical and mental burdens for field workers. Couriers in Binjai frequently report exhaustion from conducting delivery attempts two or three times for the same package simply because buyers failed to prepare cash (Safitri et al., 2025). Accumulation of return packages at the East Binjai agent warehouse also disrupts the flow of new package sorting, creating space inefficiency. Furthermore, there exists risk of package damage or loss during the return process to sellers, which, while claimable, still consumes considerable administrative time.

Table 3 provides estimated cost breakdowns associated with COD returns per 1,000 packages at the agent level. The operational cost component for couriers ranks highest, reflecting fuel and time expenditures for multiple delivery attempts. Administrative and warehouse costs register at medium levels, encompassing re-input processes and return package storage. The product damage risk component (5–8% of total returns) represents a particularly insidious cost, as it erodes seller trust in the platform logistics ecosystem.

Table 3. Estimated Losses from COD Goods Returns per 1,000 Packages at Agent

Cost/Risk Component	Impact Description	Estimated Burden
Courier Operational Costs	Fuel and time for 2x delivery attempts	High
Admin & Warehouse Costs	Re-input process and return package storage	Medium

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Product Damage Risk	Packaging damage during 3-7 day return process	5–8% of total returns
Agent Performance Decline	Decrease in success rate score in platform view	Significant

Source: Researcher Analysis Based on SPX Binjai Data and Logistics Literature.

Table 3 illustrates the systemic magnitude of a single return action perceived as trivial by consumers. These losses frequently become reasons why couriers feel frustrated and occasionally commit negligence such as failing to contact buyers yet directly assigning "order rejected" status, a phenomenon increasingly complained about by consumers in various regions (Safitri et al., 2025). The conflict of interest between courier speed targets and buyer return convenience creates tension in Binjai's local e-commerce ecosystem. This tension reflects broader structural challenges in platform economy governance.

Comparative Analysis with National and Regional Patterns

The Binjai case study reflects broader national trends while maintaining distinct local characteristics. Nationally, COD accounts for about 73.04% of e-commerce transactions, with extreme regional variation such as Gorontalo reaching 93.48% (Ramadhani et al., 2022), positioning Binjai— as a satellite city with moderate digital banking penetration—between these poles. Although the local COD return rate of 12–15% is notable, it remains below the national e-commerce average of 24.5%, suggesting that Binjai's relatively compact urban structure may support more efficient delivery logistics compared to larger metropolitan areas. Comparisons with prior studies, such as those by Asawawibul et al (2025), Baldi et al (2024), Gao et al (2026), and Sintia et al (2024), show that earlier research primarily focused on purchase intention and consumer satisfaction, emphasizing flexibility and convenience, but overlooked downstream logistical impacts—highlighting a key research gap addressed in this study. Furthermore, when compared with nearby urban centers like Medan, Binjai faces unique logistical challenges due to its rapid suburban expansion, where infrastructure development lags behind growth (Yusuf et al., 2024). This transitional, sub-urban character—neither fully urban nor rural—creates specific operational pressures, indicating the need for adaptive logistics management strategies distinct from those applied in more established urban or rural environments.

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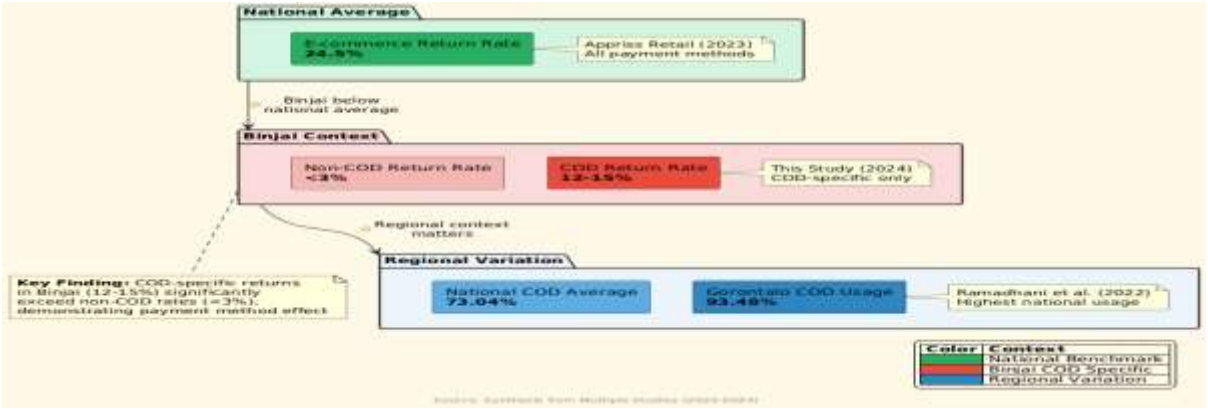


Figure 4: Comparative COD Return Rates Across Context

Figure 4 contextualizes Binjai's COD return rates against national benchmarks and regional variations. The green national average (24.5%) encompasses all payment methods, while the red Binjai COD-specific rate (12–15%) and pink non-COD rate (<3%) demonstrate the payment method's disproportionate impact. The blue regional variation indicators show how geography and infrastructure shape COD dependency. This comparative framework supports the argument that while Binjai's absolute return rate appears moderate, the COD-to-non-COD differential reveals systemic vulnerabilities requiring targeted intervention.

Ethical Dimensions and Consumer Digital Literacy

The ethical dimension of COD returns represents a critical yet often overlooked aspect of e-commerce logistics, particularly when viewed through sharia economic principles that emphasize *'adl* (justice) and *shiddiq* (truthfulness) in achieving Maqashid Syari'ah objectives. Unilateral returns without valid justification violate these principles by shifting financial and operational burdens onto couriers, sellers, and agents—parties not responsible for transaction failure—thereby creating Dharar, especially for couriers whose income depends on successful deliveries. This issue is closely linked to deficiencies in digital literacy, which, as conceptualized by Rustandi, includes digital skills, culture, ethics, and safety; evidence from Binjai indicates weaknesses across these dimensions, particularly in digital ethics, where consumers often fail to recognize the cascading logistical consequences of their return decisions. This gap fosters moral hazard, encouraging individuals to prioritize personal convenience over collective impact. Addressing these ethical deficits requires an integrated strategy combining education,

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regulation, and technological intervention, such as digital citizenship programs proposed by Permana, which emphasize ethics, empathy, and responsibility, alongside strengthened competency frameworks highlighted by Adhari to mitigate the negative effects of technology use in e-commerce ecosystems.

Strategic Recommendations and Future Directions

Based on the comprehensive analysis, this study proposes multi-level recommendations for key stakeholders. For platform managers such as Shopee, priority actions include tightening COD buyer validation algorithms and enforcing stricter sanctions for accounts with high return rates, as excessive tolerance for unilateral returns may boost short-term satisfaction but undermine long-term ecosystem sustainability; in this context, machine learning can be leveraged to detect high-risk transaction patterns and enable early intervention. For SPX agents in Binjai, adaptive delivery strategies are essential, including appointment-based delivery systems, pre-delivery confirmation calls, and SMS reminders to reduce the dominant "buyer not present" issue, alongside warehouse optimization through faster return processing to prevent operational bottlenecks. Meanwhile, for government and academic institutions, strengthening digital literacy programs remains crucial, but these initiatives must go beyond technical skills to incorporate ethical awareness and legal implications of digital transactions, as emphasized in recent research. Collaborative partnerships among platforms, educational institutions, and local authorities can foster sustainable literacy improvements, while integrating *Maqashid Syariah* provides a culturally relevant foundation to promote responsible consumer behavior in the predominantly Muslim context of North Sumatra.

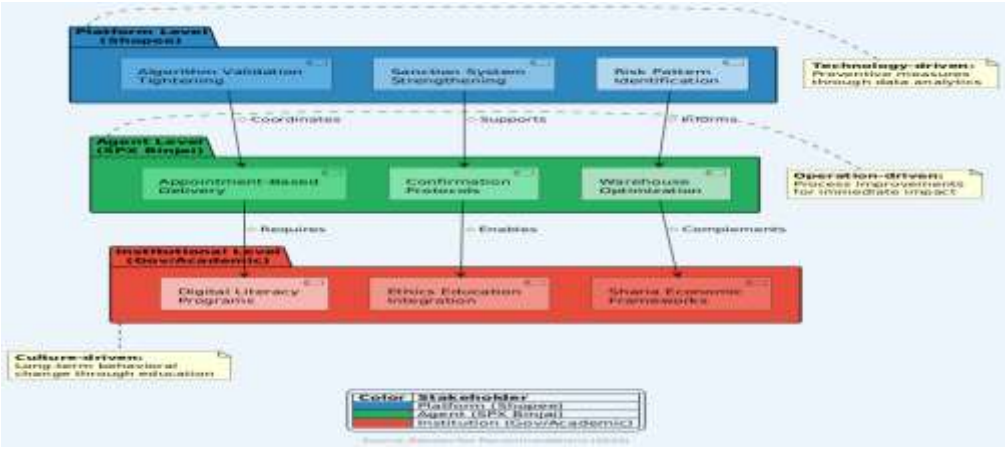


Figure 5: Multi-Stakeholder Intervention Framework

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Figure 5 presents an integrated intervention framework spanning three stakeholder levels with distinct but complementary approaches. The blue platform level emphasizes technology-driven prevention, the green agent level focuses on operational improvements, and the red institutional level targets long-term cultural change. The connecting arrows illustrate necessary coordination: algorithm tightening must coordinate with appointment systems, sanctions must support confirmation protocols, and risk identification informs warehouse optimization. This multi-level structure acknowledges that sustainable COD return reduction requires simultaneous action across ecosystem layers rather than isolated interventions.

CONCLUSION

This study concludes that the Cash on Delivery (COD) payment system exerts a positive and significant effect on goods return rates at SPX Shopee Agent Binjai, where 80% of return causes stem from buyer behavioral factors—such as unprepared cash funds, inaccurate addresses, and unilateral cancellations—reflecting low digital literacy and contractual responsibility. While COD serves as a catalyst for transaction growth among consumers underserved by digital banking, its effectiveness in suppressing logistical losses depends heavily on strengthened platform regulations, stricter sanctions for users who abuse the feature, and adaptive appointment-based delivery strategies. Theoretically, these findings reinforce the necessity of integrating ethical values and sharia economic principles—particularly *Hifz al-Mal* (asset preservation)—into digital financial literacy programs to foster a sustainable, equitable, and mutually beneficial e-commerce ecosystem for all local stakeholders.

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