

Risk Assessment of Cash on Delivery System in Indonesian E-Commerce Using House of Risk and Content Validity Index

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Abstract:- The phenomenon of rapid development of E-commerce in Indonesia is increasing every year. This is influenced by several factors, including cheaper prices and ease of use. The payment method that is often used in Indonesian E-Commerce is using the Cash on Delivery (COD) payment system with 82.26% transaction. COD payments still have risks that can harm the seller, such as the buyer not paying until the product is returned. The aim of this study is to determine the risks of the COD payment system in Indonesian e-commerce faced by the sellers. This research uses the Content Validity Index (CVI) method and the House of Risk (HOR) method. The result is that there are 21 risk indicators divided into seven risk dimensions, there are 21 risk events and there are 23 risk agents which are the main causes of risks such as increasing order volume and dissatisfaction with the quality of products received.

Keywords:- E-Commerce, Cash on Delivery, Content Validity, House of Risk.

I. INTRODUCTION

The growth of internet usage in the world is rapidly and widely, with an easy internet access making. The pace of E-commerce advancement is rapidly accelerating, that the findings from surveys on E-commerce in Indonesia reveal annual increments. There is an increase in the number of businesses in 2020 by 2,361,423 businesses, and in 2021 by 2,868,178 businesses [1]. In 2022, it is estimated that there will be 2,995,986 businesses [2]. A survey by the Indonesian Internet Service Providers Association (APJII), state that the use of internet was able to double sales compared to sales without using the internet [3].

Even though E-commerce is experiencing very fast development, this activity is experiencing logistics problems, Indonesia is one of the countries that has the biggest logistics problems, especially delivery delays [4]. Poor logistics performance is caused by inadequate infrastructure and inefficient provisions from service providers [5]. In reducing logistics problems, there are several important factors that E-commerce providers must understand, namely, quality of product information, convenience of the purchasing process, perceived security, customer service, payment capabilities and delivery services [6].

Based on these factors, E-commerce needs to control logistics activities to improve operational functions and customer service. An option available for customers through E-commerce customer service is that customers can freely choose their payment method [7]. The other survey by the Central Statistics Agency in 2023 in Indonesia, it is known that the payment method frequently used in E-commerce is using the COD payment system at 82.26% [2].

E-commerce companies send goods from sellers through their own logistics or hiring other logistics partners. This can indirectly harm the sellers and E-commerce companies, the loss referred to the COD system is vulnerable to product returns where the customer does not pay for the product so that the seller will incur additional costs to the company and courier [8]. Therefore, E-commerce needs to create a COD system policy to increase customer satisfaction and obtain added value and also reduce company losses [9].

Based on the explanation above, in forming this policy it is necessary to determine the risks that occur in the Cash on Delivery payment system. This research began by conducting a literature review and using the Content Validity Index (CVI) method among experts. Next, distribute a risk assessment questionnaire to the sellers regarding the COD payment system. The results of the questionnaire will be processed using the House of Risk (HOR) method to determine the risks that can occur to sellers in COD e-commerce transactions in Indonesia. With this research, it is hoped that it can minimize risks in the COD payment system.

II. LITERATURE REVIEW

A. E-Commerce

E-commerce is a transaction process starting from customers, selling or exchanging goods or services to information via the internet network [10]. There are four principles in running E-commerce well, namely Connection, Creation, Consumption, and Control. These principles will lead to the company's Return of Investment (ROI) [11]. There are several advantages that result from using E-commerce [12], Market Globalization, Personalized demands, Business Integration, and Equal Business Opportunities.

B. Cash on Delivery (COD)

Business transactions carried out include payment systems implemented by E-commerce which can be divided

into several types [13], Online Credit Cards, e-Wallets, Virtual Account, online stored-value systems, digital check payment systems, and wireless payment systems. According to the Central Statistics Department [14] E-commerce in Indonesia offers a variety of payment systems including inter-bank transfers, credit cards, e-Wallets, and Cash on Delivery (COD). The COD method is a cash payment made by consumers when the desired product has been received at the location [15]. The COD method provides an option to other methods because it is preferred by consumers, if the goods do not match the consumer's order, then the consumer does not have to pay for it [16].

C. Content Validity Index (CVI)

Content Validity Index is defined as how relevant the elements in the assessment indicators are and represent the meaning or important points targeted for certain assessment objectives [17]. Apart from that, another meaning is whether the sample items used in an assessment adequately represent all the items [18].

The scores in the CVI are divided into two types, first the assessment at each item level is called Item level (I-CVI) and the overall assessment is called Scale-level (S-CVI) [19]. I-CVI will show whether the items used in an assessment are considered relevant to the total number of respondents [18].

D. House of Risk

The House of Risk framework represents an evolution of the Failure Mode and Effect Analysis (FMEA) and Quality Function Deployment (QFD) methodologies. It quantifies risk levels and prioritizes risk sources based on their potential impact [20]. Provide solutions based on risk sources, risk factor probabilities, and Severity levels [21].

III. METHODOLOGY

This study focused on examining the risks associated with the Cash on Delivery (COD) payment system in Indonesia, specifically within the supply chain or operational processes as experienced by sellers in Indonesian e-commerce. The research involved 10 sellers who utilized the COD payment method, representing various business categories in the e-commerce sectors. To assess the relevance of each item, experts were asked to rate them typically on a four-point scales in the item-level Content Validity Index (I-CVI) calculation. Four experts meeting the criteria were selected as respondents for the validation process, which involved distributing questionnaires to the experts.

A. Content Validity Index (CVI)

In calculating item-level CVI (I-CVI), experts are asked to rate the relevance of each item, usually on a 4-point scale.

Table 1: Validity Test Rating Scale

Scale	Description
1	Not Relevant
2	Somewhat Relevant
3	Quite Relevant
4	Very Relevant

$I-CVI = (\text{Total expert agreeing}) / (\text{Total expert}) \quad (1)$

The number of experts involved determines how much valid data will be obtained, so that there is a calculation of the number of experts and the results that are said to be valid [22].

$S-CVI = (\sum I-CVI) / (\text{Total item}) \quad (2)$

Table 2: I-CVI Assessment Based on Number of Experts

(1) Total Expert	(2) Number of Expert Agreeing (Rating 3 or 4)	(3) ^a I-CVI	(4) ^b Pc	(5) ^c K*	(6) ^d Evaluation
3	3	1.00	0.125	1.00	Excellent
3	2	0.67	0.375	0.47	Fair
4	4	1.00	0.063	1.00	Excellent
4	3	0.75	0.250	0.67	Good
5	5	1.00	0.041	1.00	Excellent
5	4	0.80	0.156	0.76	Excellent
6	6	1.00	0.016	1.00	Excellent
6	5	0.83	0.094	0.81	Excellent
6	4	0.67	0.234	0.57	Fair
7	7	1.00	0.008	1.00	Excellent
7	6	0.86	0.055	0.85	Excellent
7	5	0.71	0.164	0.65	Good
8	8	1.00	0.004	1.00	Excellent
8	7	0.88	0.031	0.88	Excellent
8	6	0.75	0.109	0.72	Good

9	9	1.00	0.002	1.00	Excellent
9	8	0.89	0.014	0.89	Excellent
9	7	0.78	0.070	0.76	Excellent

B. House of Risk (HOR)

HOR focuses on processing data on risk events and risk causes (risk agents) to obtain risk priorities based on ARP

weights. The ARP formula itself uses the following calculations.

$$ARP(j) = O(j) \sum S(i)R(ij) \tag{3}$$

- ARPj = Aggregate Risk Potential
- Oj = Probability of Occurrence
- Si = Severity of Impact
- Rij = Correlation Between Risk Agents and Risk Events
- si = Risk event
- j = Risk agent

- The following is an explanation of the values included in the risk event and risk agent assessment [23].

Table 3: Severity Criteria

Level	Severity	Severity Criteria
1	No impact	The risk has no impact on COD activities
2	Low impact	Risk has small impact on COD Activities
3	Moderate Impact	Risk has a moderate impact on COD
4	Serious Impact	Risk has a serious impact on COD
5	Extremely Severe	Risk has an extreme impact on COD activities

Table 4: Occurrence Criteria

Level	Occurrence	Occurrence Criteria
1	Never happen	The probability of this happening is 0-25% (Risks Almost Never Happen)
2	Rarely occurs	Low probability of occurrence is 26-50% (Risk Rarely Occurs)
3	May occurs	The probability of this happening is 51-60% (Risk may occur)
4	Often occurs	The probability of this happening is 61-75% (Risks Often Occur)
5	Very often occurs	The probability of this happening is 76-100% (Risk Occurs Very Often)

Table 5: Corelation Criteria

Corelation Value	Corelation Criteria
0	No correlation
1	There is a small correlation
3	There is a moderate correlation
9	There is a high correlation

IV. RESULT AND DISCUSSION

A. CVI Indicator

Risk indicator data was collected by conducting a literature study of several previous studies related to

distribution flows using the COD payment system in e-commerce. Based on the literature study that has been carried out, there are 7 risk dimensions were obtained consisting of: Distribution, Financial, Product, Privacy, Platform, Sales and Inventory, and Macro Factor.

Table 6: Cash on Delivery Indicators and Sub-Indicators

No	Risk Dimension	Risk Indicator	Reference
1	Distribution	Deliveryspeed, Delivery Cost, The role of thirdparties	[24], [25], [9]
2	Financial	Payment policy, Buyer fails topay, PlatformCompliance, Payment information protection, Payment fee commission	[25], [26], [27], [28]
3	Product	Product quality, Product packaging, Riskof fake or imitation goods	[27], [29], [30]
4	Privacy	Confidentiality of personal information, Cheating or falsifying Personal data	[25], [31]
5	Platform	Regulatory violations, Dependence on Platform algorithms, Platform interruptions or technical failures, Platform Credibility	[32], [33], [34], [35]
6	Sales AndInventory	Inventory management, Loss of sales, Customer ratings and reviews, Error forecasting, Product returns	[36], [37], [35], [38]
7	Macro	Impact of natural disasters, Impact of Pandemic, Risk of network disruption	[37], [39], [27]

After completing the questionnaire, the recapitulation results of the questionnaire are then calculated using the I-CVI method. The results of calculations using this method

produced a total of 21 indicators which were declared valid in 7 risk dimensions with an I-CVI value of 0.94.

Table 8: List of Valid COD Indicators

Risk Dimension	Risk Indicator	Number of Expert Agreeing	I-CVI
Distribution	Delivery speed	4	1.0
	Delivery Cost	4	1.0
	The role of third parties	4	1.0
Financial	Payment policy	3	0.8
	Buyer fails to pay	4	1.0
	Platform Compliance	3	0.8
	Payment fee commission	3	0.8
Product	Product quality	4	1.0
	Product packaging	4	1.0
	Risk of fake or imitation goods	4	1.0
Privacy	Cheating or falsifying personal data	4	1.0
Platform	Regulatory violations	4	1.0
	Dependence on Platform algorithms	3	0.8
	Platform interruptions or technical failures	4	1.0
	Platform Credibility	4	1.0
Sales and Inventory	Inventory management	3	0.8
	Loss of sales	4	1.0
	Product returns	4	1.0
Macro	Impact of natural disasters	4	1.0
	Impact of Pandemic	4	1.0
	Risk of network disruption	4	1.0

B. Risk Identification

After the validation process with the experts has been completed, valid indicators can be continued to determine the

risk of events and also risk causes using the HOR approach. Based on valid risk indicators, TABLE VIII shown that there were 21 Risk Events and 48 Risk Agent results.

Table 8: Risk Identification

No	Risk Dimension	Risk Event	Risk Agent
1	Distribution	The length of delivery duration in the COD payment system (E1)	Items Lost or Damaged During Shipping (A1)
2			Errors in Order Delivery (A2)
3			Increased order volume or high workload on the logistics side (A3)
4		Changes in shipping costs when sending goods using COD (E2)	Increase in logistics costs (A4)
5			The COD administration process is complicated and requires additional costs (A5)
6			Variability in shipping costs between regions (A6)
7		Involvement of third parties as delivery service providers (E3)	Delay in Handling Payments from Third Parties (A7)
8			Misuse of customer and seller information or data (A8)
9			Interference or system failure from the third party (A9)
10	Financial	Changes to payment policies set by the Platform (E4)	Delays or delays in disbursing funds from COD sales to sellers from the Platform (A10)
11			Payment Policy Changes Without Notification or Approval (A11)
12			Non-Transparent Fees and Deductions (A12)
13		Failure of the buyer to make payment (E5)	Fraud by Using Certain Reasons (A13)
14			Buyer's Inability to Make Payment (A14)
15			Interception or Theft of Orders in Transit (A15)
16		Incompatibility of regulations and financial policies implemented by the E-commerce Platform (E6)	Violations of Payment Regulations or Data Security (A16)
17			Policy changes and lack of transparency regarding fund management and payments (A17)
18			Delay in Handling Complaints or Disputes (A18)
19		Changes in sales commission fees from the Platform (E7)	Platforms that do not provide transparency or clear information regarding commission fee structures (A19)

20			Commission Fees That Are Disproportionate to the Services Received (A20)
21	Product	Differences in the quality of products sold (E8)	Poor handling during the shipping process (A21)
22			Product Delivery Does Not Conform to Specifications(A22)
23		Damage to product packaging during COD delivery (E9)	Bad weather during shipping may damage the product if packaging is inadequate (A23)
24			High costs of safe product packaging(A24)
25		Fake or imitation goods (E10)	Not being careful in product verification or lack of quality control(A25)
26		Abuse of the Goods Return System by buyers(A26)	
27			Does not provide accurate or appropriate product information(A27)
28	Privacy	Fraud or falsification of data when using the COD method(E11)	Buyers who make fictitious transactions (A28)
29	Platform	General Regulatory Violations committed by the Platform (E12)	Indecisiveness of regulations implemented (A29)
30			There is no regulatory transparency provided to sellers (A30)
31		Platform algorithms that are difficult for sellers to understand (E13)	Lack of information regarding Algorithms received by sellers (A31)
32			Injustice in the application of Algorithms on the Platform (A32)
33		Technical disruption or failure in the COD system (E14)	Internal problems on the E-commerce Platform (A33)
34			The system maintenance or update process carried out by the Platform (A34)
35		Decreased Platform Credibility (E15)	Poor or unresponsive customer service from the Platform (A35)
36			The appearance of the application is unattractive and the lack of promos offered (A36)
37	Sales And Inventory	Inaccurate Inventory Management in the COD System (E16)	Inaccurate transaction reporting (A37)
38			Inconsistency in inventory data (A38)
39		Lost sales on the COD payment system (E17)	Rejection or Cancellation of Orders by Buyers (A39)
40			Buyer Unready or Unwilling to Pay (A40)
41		High Rate of Product Returns in the COD System (E18)	Returning products without a clear or valid reason (A41)
42			Dissatisfaction with the quality of the product received (A42)
43	Macro	Impact of Natural Disasters on COD payment systems (E19)	Disruption of Inventory or Supplies management (A43)
44			Delays in the delivery process due to disruption in the logistics system (A44)
45		Impact of the Pandemic on the COD payment system (E20)	Movement Restrictions and Lockdown (A45)
46			Inconvenience of cash payments (A46)
47		Internet network disruption during COD payments (E21)	Technical Disturbances in Network Infrastructure (A47)
48			Internet connection instability (A48)

C. House of Risk

Risk processing in House of Risk phase 1 includes 2 stages, namely: First, determining the correlation matrix to determine the relationship or link between Risk Event and

Risk Agent and second, calculate the aggregate risk potential (ARP) value and Risk Agent prioritization. Based on the results of data processing, the following TABLE IX are the results of the House of Risk processing matrix

Table 9: Matrix HOR

Risk Event	Risk Agent																								Severity
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	
E1	9	3	9						3			1			3						3				3
E2				3	1	3																		3	4
E3			9				3	1	3						3						3	3	1		2
E4										3	9	3													2
E5	3	3											3	3	1						3	9	1		4
E6							3			3						1	3	3							2
E7																			3	1					3
E8																					9	9	1		3
E9			3																		3		3	3	3
E10																						3			4
E11													3												3
E12																									3
E13																									2
E14			3						3																3
E15						1			1	3									3						3
E16																									2
E17	3			3		1							3	3		3		1			1	3			4
E18													3	3							3	3			4
E19															1										3
E20															1										2
E21																									3
Occurrence	1	1	3	3	2	4	3	2	2	3	2	1	2	2	1	1	2	2	2	1	2	1	2	1	
ARP	5 1	2 1	1 8 9	7 2	8	7 6	3 6	4	5 4	6 3	3 6	9	9 0	7 2	2 4	1 4	1 2	3 8	1 8	3	1 5 8	1 0 5	3 6	2 1	
Rank	2 0	3 3	1 1	1 5	4 0	1 5	2 5	4 7	1 8	1 3	2 5	4 3	8	1 1	3 0	3 8	4 0	2 4	3 6	4 8	2 4	4 2	5 3	3 3	
%	2. 2	0. 9	8. 0	3. 1	0. 3	3. 2	1. 5	0. 2	2. 3	2. 7	1. 5	0. 4	3. 8	3. 1	1. 0	0. 6	0. 5	1. 6	0. 8	0. 1	6. 7	4. 5	1. 5	0. 9	

Table 10: Continuation of Matrix HOR

Risk Event	Risk Agent																		Severity						
	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42		A43	A44	A45	A46	A47	A48
E1																1			3	3	3				3
E2																									4
E3																				3					2
E4					1																	1			2
E5				3											3	3	3	3							4
E6		3			1	1																			2
E7					1	3																			3
E8				3														3							3
E9																									3
E10	3	1	9																						4
E11				3																					3
E12					1	3		3																	3
E13				1				9	3																2
E14										3	3												3	3	3
E15									3		3	3													3
E16	1									1			3	9											2
E17	1	1		1			3					3			9	3		3			3				4
E18	3		3													3	9	9							4
E19																			3	9					3
E20																				3	3	3			2

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