

By ป๋องเทอร์โบรักช้อปปี้

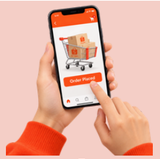
Situation Analysis: The COD Challenge

COD rejections drive significant financial losses and operational inefficiencies.

Shopee

FAILED DELIVERY:

A LAST-MILE LOSS DRIVEN BY REPEATABLE BEHAVIOR



Order Placed → Shipped → Failed Delivery → Return

Each failed delivery creates real losses across the ecosystem

฿44
Logistics cost per failed order
(forward ฿24 + reverse) ฿20

~฿600
Seller's sales at risk per order
(avg. basket size)

Lost GMV and revenue for Shopee
(no commission earned)

COD magnifies the risk: Buyer commitment occurs only when the parcel arrives.

1 UNINTENTIONAL FAILURE

Wants to receive, but can't.



- Not at home
- Wrong / incomplete address
- Unreachable at delivery
- Timing mismatch

Mainly Logistics problem

2 BEHAVIORAL FAILURE

Can receive, but chooses not to.



- Changes mind
- Repeated COD rejection
- Impulsive order (low commitment)
- Finds a cheaper / faster option and reorders elsewhere

Mainly a Behavioral problem

1 CURRENT POLICIES (REACTIVE)

Shopee already restricts high-risk COD users.

- Sellers report buyers 3 times → Account ban
- Temporary COD suspension for 30 days when unsuccessful COD payment rate ≥15% in 365 days and at least 3 unsuccessful payments in 90 days

2 THE GAP

Intervention happens mainly after negative behavior is observed.

Past COD failure → **Rule triggered** → **Restriction** (e.g. 30-day suspension)

However, there are more signals we can use:

- **Buyer history** (30/90/365 days)
- **Current order**
- **Address quality**
- **Contactability** (phone, call logs)

3 OUR OPPORTUNITY

Move from reactive rules to predictive prevention.

- **Predict** — Who / which order is at risk?
- **Prevent** — Intervene before another failed delivery
- **Reinforce** — Reward behaviors that lead to successful delivery

Strategy : SHOP SHIELD

an ML model that scores every buyer's failed-delivery risk and sorts them into 3 tiers.
Each tier sees a different checkout interface.

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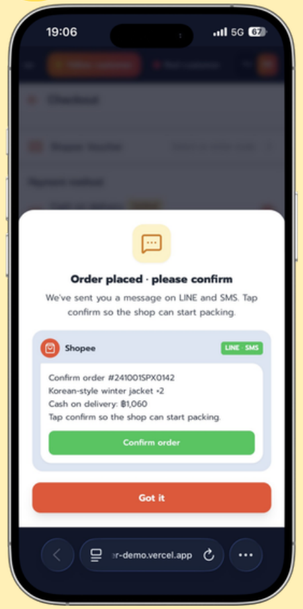
SHOP SHIELD

Green **Normal User (85%)**
1 Normal checkout interface
2 Priority Packing/Delivery

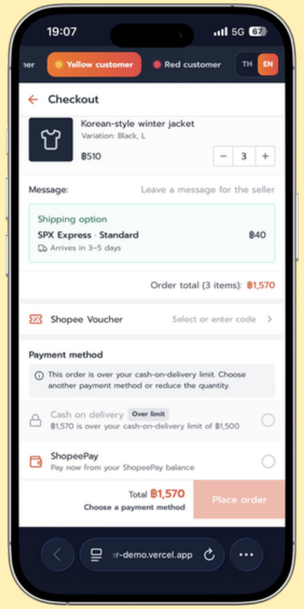
Interface Demo

ML risk scoring

Yellow **Suspected Risk (12%)**

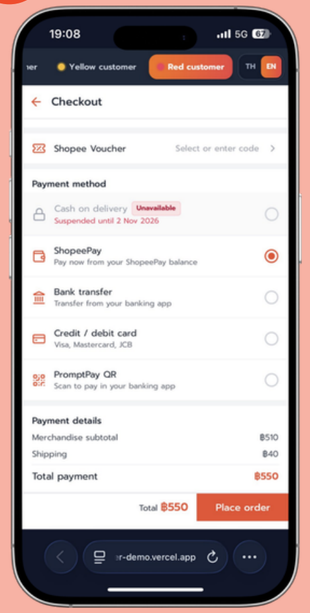


Voucher unavailable with COD Order Confirmation



Limit on COD cash amount

Red **Confirmed High Risk (3%)**



COD restricted

Note: Zone percentages are indicative thresholds, not fixed quotas. Actual splits depend on live data.

Source:
Shopee COD rule: bigseller.com/blog/articleDetails/practical-tips-to-effectively-manage-cod-orders-on-shopee.2942.htm
COD vs prepaid failure (India): dazeinfo.com/2024/06/05/over-25-of-cod-orders-fail-a-major-dent-in-indias-e-commerce-business/
Kandula et al. (2021): doi.org/10.1016/j.dss.2021.113584

How

Our ML model reads these four data groups and combines them into one risk score: **$P(fail) = \sigma(\Sigma\, w_i x_i + b)$** with weights learned from real delivery outcomes. The score maps each buyer to Normal User, Suspected Risk, or Confirmed High Risk.

Data Group	Key Variables	Decides	usage(%)
Rejection History	**Determine how often this buyer accepted, rejected, or cancelled COD over: 30 / 90 / 365 days and who caused each failure**	**Sets the main tier. Courier-caused failures don't count against the buyer.**	**≈ 40%**
Account	**Account age, how often it returns or refunds, how often it cancels COD**	**New account placing a large COD order caused suspected risk of failed delivery.**	**≈ 15%**
Address	**Analyze province, district, subdistrict and postcode match: How far is the map pin from the real address, How many accounts share it.**	**Address quality + fraud-cluster detection caused high risk of failed delivery.**	**≈ 20%**
Phone	**Check is the number verified, How many accounts use it, Does the buyer answer calls or reply to SMS.**	**Spots fake accounts and determine if we can reach this buyer.**	**≈ 15%**

Note: Variables and usage weights are illustrative. The model calibrates exact weights from real platform data.

Why 3 tiers?

1 **Cost Asymmetry**
Each risk level incurs different control costs, making a flexible tier system more cost-effective than a binary "allow or ban" approach.

2 **High Failure Rates of COD**
Cash-on-Delivery orders fail significantly more often than prepaid orders

Case Study
Over 25% of COD orders fail compared to **just 2–3%** for prepaid

3 **Predictive Address/Contact Data**
Address and contact data can reliably predict delivery success, which reduces overall costs by approximately 10% (Kandula et al., 2021).

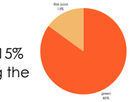
Why ML?

ML still produces a risk score it's just the engine. Unlike a fixed formula, it **weighs dozens of interacting signals**, adapts as fraud patterns change, and learns from every delivery outcome.



Why AI shield worked?

1 **It targets the real problem**
Failed deliveries cluster in a small group of buyers. Controlling only the riskiest ~15% cuts failures without touching the other 85%.



2 **Each tier gets the right fix**
Yellow gets light friction (order confirmation, no voucher with COD). Red switches to prepaid. Normal buyers see no change, so sales aren't lost.

3 **It stays fair and self correcting**
Courier faults are stripped out, tiers are reversible, and the model keeps learning from every delivery outcome.

Strategy : SHOP STREAK & SMART-FEED

Active Behavioral Intervention via Gamified Streaks & Post-Purchase Feed Safeguards

Shopee

SHOP STREAK

Zero-Rejection Streak Yellow Zone Red Zone **Only**

Problem : Failed COD Delivery costs Shopee **฿44** / Package
(Forward Shipping ฿24 + Reverse Shipping ฿20)

Save Reverse Fee > **Reinvest in Tiered Coupons** > **net-positive for at-risk buyers**

STREAK	Reward	Saved	Net	Behavioral Goal
3 in a row	฿30 coupon (min ฿100)	฿60	+฿30	Low Threshold / Quick Win
5 in a row	฿50 (min ฿200) + Grade A badge	฿100	+฿50	Habit Loop Formation
10 in a row	฿100 (min ฿300) or 2 free-ship codes	฿200	+฿100	Heavy Buyer Retention

Avg coupon cost ≈ ฿10/order.
Break-even: ฿20 × failures avoided + margin from extra orders ≥ coupon cost

"Holds if the drop would" otherwise fail. Size it in a pilot. before counting sale margin and repeat purchases.

SAFEGUARDS

First attempt only
Rider can't reach buyer, parcel re-scheduled: streak resets to 0

Min spend per tier
฿100 / ฿200 / ฿300 so coupons drive basket size

24h dispute
Rider never called but status = Failed: buyer keeps the streak

Delivered orders only
Cancelled in transit or returned: not counted

60-day window
Pushes purchase frequency up

RIDER INCENTIVE

฿15 per first-attempt drop, paid instantly
Proposal: flagged Yellow-zone COD parcels
Proof: call log + GPS + buyer OTP

SHOP SMART-FEED

Don't stop recommendations. Change what we recommend.

TIMELINE TRACK

CONFIRM ORDER — TO SHIP — DELIVERY COMPLETE

1 ORDER

Customer places an order

2 RISK ASSESSMENT

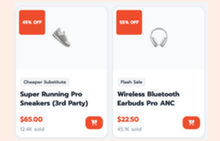

Analyze behavior to identify second-mind risk

3 HIDE SIMILAR PRODUCTS


Reduce visibility of similar products

4 PUSH COMPLEMENTARY PRODUCTS

Recommend complementary product instead

5 NORMAL RECOMMENDATION


Return to normal recommendation

How it work

DATA INPUT
- BROWSING HISTORY
- PURCHASE BEHAVIOR
- CANCELLATION HISTORY
- COD REJECTION

A/B TESTING
Why not a fixed timer? A 48h timer ends while a 4-day parcel is still moving. cheaper rivals return on day 3 and the buyer cancels mid-transit.
Rule: start at order, hide until Delivered. Cap if the courier status stalls:

24 H	48 H	72 H
low	Medium	High

A/B test to find the best window

CHANNELS

Home feed / You Might Also Like
Similar items and rival shops −100% ; accessories +150% for this buyer

Search bar
Never blocked. Original shop / Mall ranks top 1-3, cheaper rivals pushed down

Ad auction
Buyer temporarily excluded from rival ad target pools while in transit

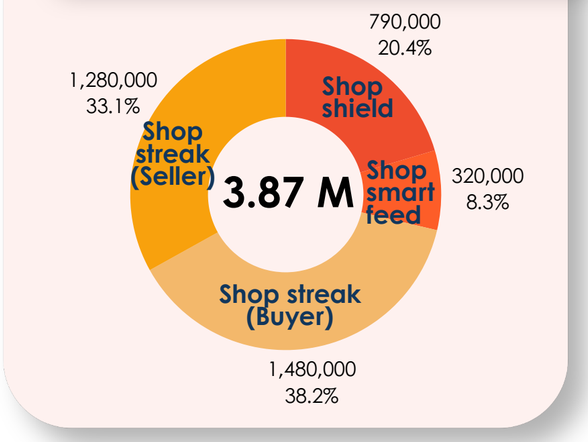
EXPECTED IMPACT
- ↓ Cancellation Rate
- ↓ COD Rejection
- ↑ Conversion & GMV

Financial Viability & Implementation: Unlocking ฿14.85M in Total Value

A 6-month phased rollout deploying ฿3.87M in tech and incentives to reduce COD rejections by 41% and deliver a 6.3-month payback.

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Capital Allocation Breakdown

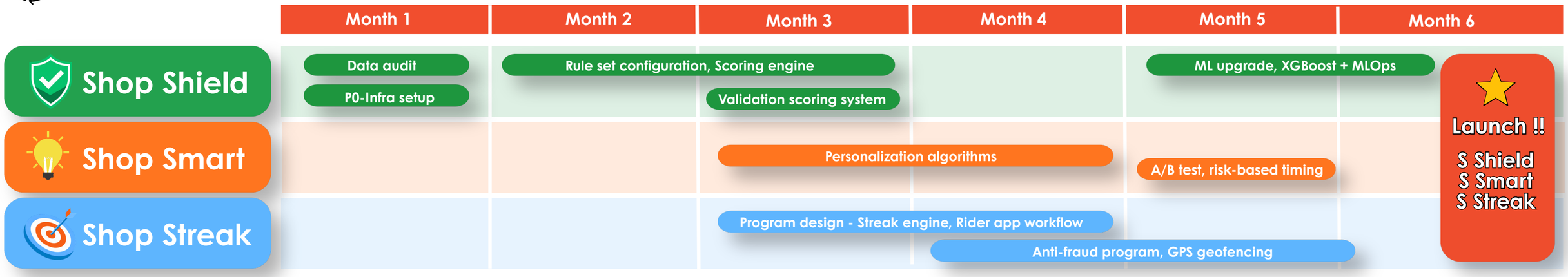


Reverse Logistics Saved 166.8k failed deliveries avoided × ฿44 avg return fee	**=+14.02M**
Retained GMV Contribution 166.8k failed deliveries x ฿600(aov) x 10%	**=+19.12M**
Total Gross Value Realized	**=+33.15M**

ROI = 127%
ROI Logistics

PBP = 5.3 Month
Combied strategy

Phased implmentation Roadmap



Analysis | Strategy | Finance & Implementation | Impact

Cutting Failed Deliveries by 78.3% Across Core Operations

Eliminating 318,713 failed deliveries per year to generate 14.026M THB in direct annual logistics savings.

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Shop Shield

Goal: Fraud mitigation & order validation.

From

High-risk COD orders go straight to fulfillment without verification, **causing massive doorstep refusals.**

To

Risk detection by AI that flags high-risk COD orders and **converts** them to prepaid or **verified shipping**.

Impact

9.889M THB total annual benefit

244,200 failed orders avoided **(-65.0%)**

1.0 Month Payback (months)

Shop Smart

Goal: Reduce post-purchase cancellations & build brand awareness.

From

Customers see ads for cheaper alternatives after buying, causing them to **regret the purchase** and cancel.

To

Hiding competitor ads during the first 48 hours so **customers don't find cheaper prices elsewhere.**

Impact

4.052M THB total annual benefit

101,750 failed orders avoided **(-25.0%)**

1.1 Month Payback (months)

Shop Streak

Goal: Maximize first-attempt delivery rates.

From

Buyers reject deliveries, while **unmotivated riders lack incentives** to complete first-time deliveries.

To

A two-sided system **rewarding buyers with "streaks"** for order acceptance and **paying riders bonuses** verified by geofencing.

Impact

0.478M THB total annual benefit

101,750 failed orders avoided **(-25.0%)**

21.9 Month Payback (months)

Combined Strategy

17.91M THB annual loss across **407,000** Baseline fail delivery order

78.3% orders saved

7.852M THB conservative net benefit



Appendix

Asuumption drivers

ASSUMPTIONS — drivers behind every number (with sources)			
Parameter	**Value**	**Unit**	**Basis / Source**
Total annual orders	37,000,000	orders/yr	SUCC 2026 Shopee case brief
COD share of orders	40.0%	% of orders	58% of Thai consumers used COD in past month (paymentscmi 2024); ~40% order-sha estimate
COD orders per year	14,800,000	orders/yr	Calculated
Failed-delivery rate	1.10%	% of orders	SUCC 2026 case brief
Failed deliveries per year	407,000	orders/yr	Calculated (= 407,000)
Cost per failed delivery	44	THB	SUCC case: 24 forward + 20 reverse leg
Reverse-leg saving per successful receipt	20	THB	SUCC case
Baseline annual failed-delivery loss	17,908,000	THB/yr	Calculated (= 17,908,000)
Average order value (AOV)	600	THB	Est. from US$289 spend/capita & 40.6M shoppers (paymentscmi 2024, ~US$13/order)
Contribution margin on AOV	10.0%	% of AOV	Assumption (marketplace take-rate / seller contribution)
Avg COD orders per buyer per year	12	orders	Assumption (active repeat COD buyer)
COD buyers per year	1,233,333	buyers	Calculated
REACH / ADOPTION PER STRATEGY			
Main — share of COD orders scored	100.0%	% of COD orders	Every COD order passes the scoring engine
Main — high-risk orders intervened (yellow+red)	25.0%	% of COD orders	First-time buyers 30-40% RTO; top 20-30% pincodes drive most RTO (eGrow 2026)
Sub 1 (Ads) — share of orders covered	100.0%	% of orders	All post-order sessions get the 48h feed adjustment
Sub 2.1 (Gamification) — buyer participation	20.0%	% of COD buyers	Opt-in loyalty/gamification take-up assumption
Sub 2.2 (Rider) — share of COD deliveries covered	100.0%	% of COD deliveries	All COD deliveries eligible for rider incentive

Appendix

Financial cost breakdown

FINANCIAL — strategy cost breakdown (every line has a source)				
Item	**Type**	**Estimated Cost (THB)**	**Reference / Source**	**Notes**
MAIN STRATEGY — AI Blacklist & Credit Scoring				
Primary Database (Aurora)	OpEx	130,000	https://aws.amazon.com/rds/aurora/pricing/	Stores buyer/order history & scores
In-Memory Cache (ElastiCache)	OpEx	75,000	https://aws.amazon.com/elasticache/pricing/	Low-latency score lookup at checkout
Web & API Servers (EKS)	OpEx	170,000	https://aws.amazon.com/eks/pricing/	Hosts scoring service
Network & AI API Layer	OpEx	80,000	https://openai.com/business/pricing/	LLM/API calls for enrichment
AI Risk Model & Feature Engineering	CapEx	150,000	https://www.ismtech.net/it-salary-report/	ML engineer build cost (TH salary)
Data Pipeline & Real-Time Stream	CapEx	100,000	https://www.tmes.co.th/insights/how-much-does-it-outsourcing-cost-in-thailand-2026-pricing-guide	Ingest order/delivery events
Scoring Engine & API Integration	CapEx	100,000	https://www.tmes.co.th/insights/how-much-does-it-outsourcing-cost-in-thailand-2026-pricing-guide	Checkout integration
Training Infrastructure & MLOps	CapEx	50,000	https://www.salttechno.ai/datasets/ai-development-cost-benchmark-2026/	Retrain/monitor setup
Subtotal — MAIN STRATEGY		**855,000**		
SUB-STRATEGY 1 — Ads Algorithm Adjustment				
Event Bus (AWS MSK / Kinesis, 37M events)	OpEx	30,000	https://aws.amazon.com/msk/pricing/	Order-event stream
Filter Cache (ElastiCache Redis extra memory)	OpEx	25,000	https://aws.amazon.com/elasticache/pricing/	Holds 48h suppression state
Search / Recommendation Engineer	CapEx	200,000	https://www.ismtech.net/it-salary-report/	Feed re-ranking logic
Backend Eng — Event Trigger & Order State Machine	CapEx	90,000	https://www.tmes.co.th/insights/how-much-does-it-outsourcing-cost-in-thailand-2026-pricing-guide	Post-order state logic
A/B Testing Framework Integration	CapEx	80,000	https://www.tmes.co.th/insights/how-much-does-it-outsourcing-cost-in-thailand-2026-pricing-guide	24/48/72h experiments
Subtotal — SUB-STRATEGY 1		**425,000**		
SUB-STRATEGY 2.1 — Doorstep Conversion & Gamification (Buyer)				
Coupon Subsidies	OpEx	2,000,000	*Internal Shopee Voucher Baseline*	Streak reward budget (30/50/100 THB tiers)
Push Infra (FCM API + ElastiCache state engine)	OpEx	100,000	https://firebase.google.com/pricing	Notifications & streak state
Native UI/UX Design & Mobile Dev	CapEx	100,000	https://www.salttechno.ai/datasets/ai-development-cost-benchmark-2026/	Streak screens
Real-Time Streak Engine Backend	CapEx	100,000	https://www.ismtech.net/it-salary-report/	Count/reset/60-day window
Anti-Fraud & Sybil Detection Logic	CapEx	100,000	https://www.ismtech.net/it-salary-report/	Stop multi-account farming
Reward Ledger & Auto-Issuance API	CapEx	80,000	https://www.ismtech.net/it-salary-report/	Issue coupons on milestone
Subtotal — SUB-STRATEGY 2.1		**2,480,000**		
SUB-STRATEGY 2.2 — Driver-Assisted Sales Incentive (Rider)				
Rider Bonus	OpEx	2,000,000	*Assumption (see Assumptions tab)*	Per-successful-receipt incentive
Image Storage & GPS (AWS S3 + Google Maps API)	OpEx	14,250	https://aws.amazon.com/s3/pricing/	Proof-of-delivery + geofence
Rider Mobile App Action Workflow	CapEx	150,000	https://www.ismtech.net/it-salary-report/	In-app rider flow
Instant Driver Wallet & Payout API	CapEx	90,000	https://www.tmes.co.th/insights/how-much-does-it-outsourcing-cost-in-thailand-2026-pricing-guide	Real-time payout
GPS Geofencing & Fraud Verification	CapEx	90,000	https://www.tmes.co.th/insights/how-much-does-it-outsourcing-cost-in-thailand-2026-pricing-guide	Verify real delivery
Rider Onboarding & Interactive Training	CapEx	70,000	https://www.ismtech.net/it-salary-report/	Adoption
Subtotal — SUB-STRATEGY 2.2		**2,414,250**		
COMBINED SUMMARY				
Main — AI Scoring		855,000		
Sub 1 — Ads Algorithm		425,000		
Sub 2.1 — Gamification		2,480,000		
Sub 2.2 — Rider Incentive		2,414,250		
TOTAL EXPENDITURE (Year 1, all strategies)		**6,174,250**		

Appendix

Impact

IMPACT — reasonable, source-backed estimates (slide-ready)

Drivers (linked from Assumptions):	
Baseline failed deliveries / yr	407,000
Cost per failed delivery (THB)	44
Average order value (THB)	600
Contribution margin	10.0%

Strategy	Reduction in failed deliv. %	Failed orders avoided / yr	Logistics cost saved (THB/yr)	Retained GMV margin (THB/yr)	Total annual benefit (THB)	Strategy cost (THB/yr)	Net benefit (conservative)	ROI (logistics only)	ROI (incl. margin)	Payback (months)	Basis / Source
Main — AI Risk Scoring & Tiering	60.0%	244,200	10,744,800	14,652,000	25,396,800	855,000	9,889,800	1157%	2870%	1.0	Biggest lever: fraud detection 5-10% + high-risk COD->prepaid (2-4pp p converted). COD 49% vs prepaid 3% RTO (ClickPost; eGrow 2026)
Sub 1 — Ads Algorithm (second-mind)	25.0%	101,750	4,477,000	6,105,000	10,582,000	425,000	4,052,000	953%	2390%	1.1	Cuts post-purchase cancellation by lowering comparison regret in first14 lever; internal AB to confirm)
Sub 2.1 — Gamification (buyer streak)	15.0%	61,050	2,686,200	3,663,000	6,349,200	2,480,000	206,200	8%	156%	11.1	Incentive-based acceptance moves 2-3% uncertain deliveries to succe (eGrow); gamification lifts repeat/engagement (OpenLoyalty)
Sub 2.2 — Rider Incentive	15.0%	61,050	2,686,200	3,663,000	6,349,200	2,414,250	271,950	11%	163%	10.8	First-attempt success via rider bonus + geofencing; confirmation/follow-u 15pp (eGrow 2026)
COMBINED (de-duplicated)	**78.3%**	318,783	14,026,441	19,126,965	33,153,406	6,174,250	7,852,191	127%	437%	5.3	Combined uses 1-(1-r1)(1-r2)... so overlapping effects are NOT double- Within eGrow's 30-50% full-deployment range.

HEADLINE NUMBERS FOR SLIDE

Baseline annual loss	17,908,000	THB/yr
Failed deliveries avoided / yr (combined)	318,783	orders
Annual logistics saving (combined)	14,026,441	THB/yr
Total annual benefit (incl. retained margin)	33,153,406	THB/yr
Year-1 investment	6,174,250	THB
Net benefit Year 1 (conservative)	7,852,191	THB
Payback (conservative)	5.3	months
ROI Year 1 (conservative / incl. margin)	127%	-> see also incl. margin

Conservative ROI counts only the 44 THB logistics saving; 'incl. margin' adds retained gross profit from the recovered sale (AOV x margin). Main scoring is the ROI engine; incentive strategies add reach at lower ROI.

Appendix

Implementation timeline

IMPLEMENTATION TIMELINE — per strategy (6-month rollout)									
Task / Activity	Phase	Responsible Role	M1	M2	M3	M4	M5	M6	Purpose
MAIN STRATEGY — AI Risk Scoring & Tiering (green/yellow/red)									
Data audit + event pipeline (4 risk pillars)	P0	Data/Infra Eng							Confirm history/order/address/phone data exists and stream it
Rejection-reason + address + phone enrichment	P0	Backend + Data Eng							Separate user vs courier fault; pin-distance; account linkage
Scoring rules + green/yellow/red cut-offs	P1	Data Analyst + PM							Shopee thresholds (15% / 3 fails) -> tier actions
Scoring engine + checkout integration	P1	Backend + Frontend							Red=prepay/confirm, Yellow=warn courier, Green=priority
Shadow mode + validation	P1	Data Analyst + BE							Score silently, compare to real failed deliveries
(Optional) ML upgrade — XGBoost + MLOps	P3	ML Engineer							Swap rules for ML once labels accumulate
SUB-STRATEGY 1 — Ads Algorithm (second-mind suppression)									
Post-order trigger + order state machine	P1	Backend Eng							Fire 48h suppression window after order
Hide similar + push complementary products	P2	Rec-sys Eng							Cut post-purchase regret, keep selling add-ons
A/B test 24/48/72h + risk-based timing	P2	Data Analyst + ML							Find best window; later tie to risk score
SUB-STRATEGY 2.1 — Gamification / Streak (buyer)									
Streak engine (count/reset/60-day window)	P1	Backend Eng							First-time-success streak per buyer
Reward ledger + auto-issue coupons	P2	Backend Eng							30/50/100 THB tiers, profitable vs 20 THB saving
Anti-fraud / Sybil check	P2	Backend + ML							Stop multi-account coupon farming
Streak UI + 24h dispute button	P2	Frontend Eng							Show progress, protect goodwill
SUB-STRATEGY 2.2 — Rider Incentive (first-attempt success)									
Rider app workflow + instant wallet/payout	P1	Backend Eng							Pay 15 THB per successful receipt
GPS geofencing + fraud verification	P2	Backend Eng							Verify real delivery before payout
Rider onboarding + training rollout	P2	Ops + PM							Drive adoption across riders
SHARED PRE-REQ									
Data accumulation for ML (if no labels)	Pre	Data Eng							Rule-based first generates labels for ML
Legend:	Full month		Partial month		Data accumulation				
	Active full month								
	Active partial								
	Data accumulation								