

BALANCED SCORECARD: SETTING KPIS FOR VARIOUS DEPARTMENTS IN AN ON-DEMAND LOGISTICS COMPANY

OENG1183/1185 ENGINEERING
CAPSTONE PROJECT
(PARTS A & B)

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Ahamove



BACKGROUND & MOTIVATION

As Ahamove scaled rapidly across Vietnam, it faced critical challenges with manual performance tracking, inconsistent KPI definitions, and siloed departmental reporting. These inefficiencies caused delays in decision-making and missed opportunities for cost and service optimization. The company's reliance on spreadsheets made it difficult to align metrics across business units.

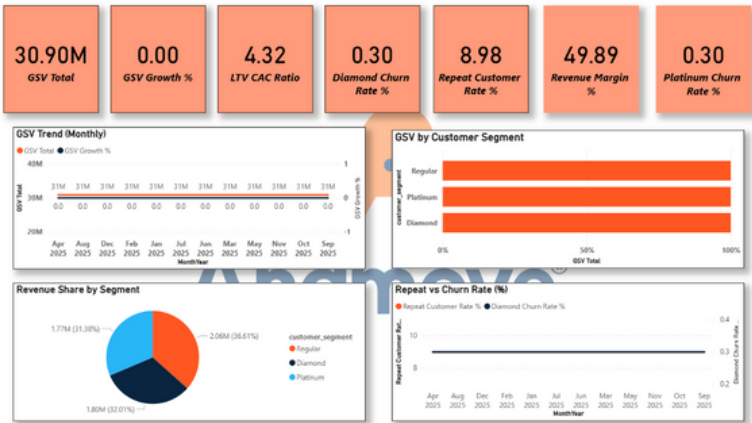
This project was initiated to solve those pain points by building a **centralized, automated, and AI-assisted performance management system** that could provide:

- Real-time operational visibility**
- Predictive insights**
- Strategic control**
- Lightweight usability** for everyday business stakeholders

EXPERIMENT & RESULTS

Internal Testing (Not in Production):

- Trained **XGBoost classification models** on one year of historical KPI data for each department
- Goal:** Predict whether the current month's KPI target will be met, using only partial-month data as input
- Achieved **$R^2 > 0.9$** and high classification accuracy for key KPIs, including delivery cost, support cost, and CSAT
- Production Replacement:** OpenAI Assistant now performs the same forecasting — taking a year's worth of data for each department and analyzing the current month's partial results to predict KPI achievement at month-end

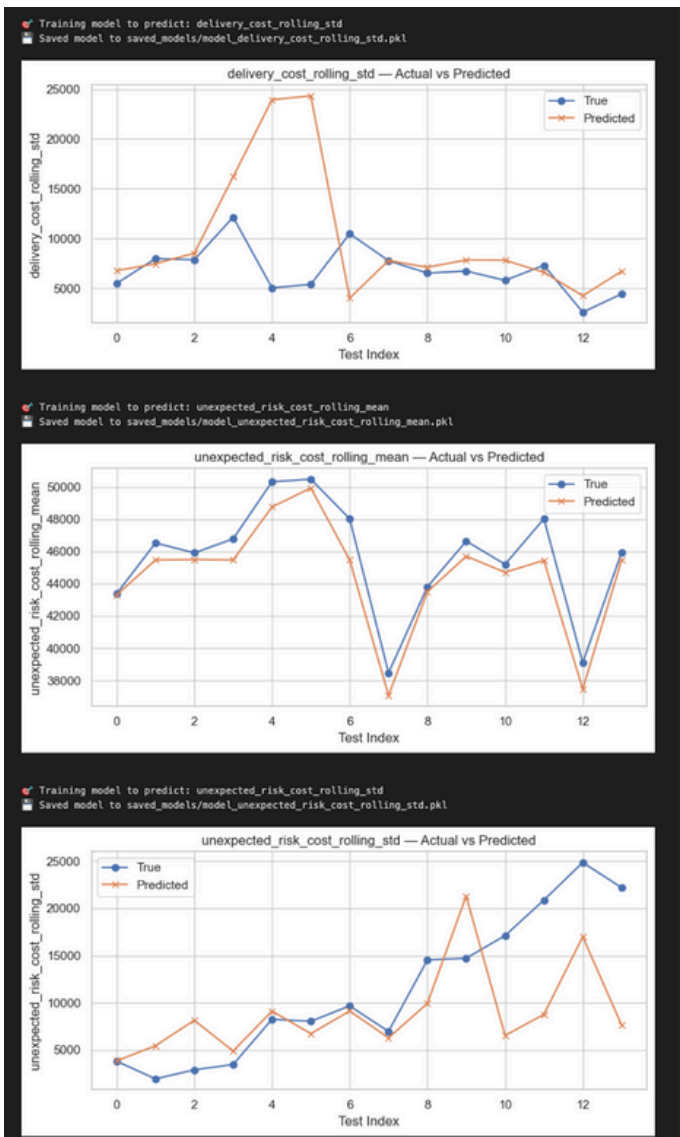


Caption: Example of real-time departmental KPI dashboard used for analysis and predictions.

Operations KPI	KPI	Formula	Strategic Theme	Type	Target	Weight (%)	Frequency	Criticality
Finance	Risk-Cost Ratio %	Unexpected risk costs ÷ Total orders × 100	Financial Control	Lag	< 1%	20	Monthly	A
Finance	Commission Rate %	(Commission revenue ÷ Gross order value) × 100	Cost Efficiency	Lag	≥ 20%	40		A
Customer	Delivery Success Rate %	Successful deliveries ÷ Total orders × 100	Reliability	Lag	≥ 98%	30	Monthly	A
Customer	On-Time Completion Rate %	Orders completed within SLA ÷ Total orders × 100 SLA = lead-time from driver accept to final delivery	SLA Adherence	Lag	≥ 96%	25	Monthly	A
Customer	Driver Quality Rate %	Active drivers with rating ≥ 4.9 stars ÷ All active drivers × 100	Service Quality	Lead	≥ 95%	25	Monthly	B
Customer	Driver Retention Rate %	Drivers active in current & prior period ÷ Drivers in prior period × 100	Supply Stability	Lead	≥ 80%	25	Quarterly	B

Sale KPI	KPI	Formula	Strategic Theme	Type	Target	Weight (%)	Frequency	Criticality
Finance	GSV Growth %	(Current GSV - Prior Period GSV) ÷ Prior Period GSV × 100%	Growth	Lag	≥ 20% YoY	40	Quarterly	A
Finance	Revenue Margin %	(Revenue - Cost of Confirmed Orders) ÷ Revenue × 100%	Profitability	Lag	≥ 30%	35	Monthly	A
Finance	LTV / CAC Ratio	# Repeat Customers ÷ Customer Acquisition Cost	Efficiency	Lag	≥ 3.0	25	Monthly	B
Customer	Repeat Customer Rate %	# Repeat Customers ÷ Total Customers × 100%	Customer Loyalty	Lag	≥ 40%	30	Monthly	B
Customer	Diamond Customer Churn Rate %	# Churned Diamond Customers ÷ Total Customers × 100%	Retention	Lag	≤ 10%	35	Monthly	B
Customer	Platinum Customer Churn Rate %	# Churned Platinum Customers ÷ Total Customers × 100%	Retention	Lag	≤ 10%	35	Monthly	B

Caption: Extract from the standardized KPI dictionary co-developed with department stakeholders.



Caption: Sample model prediction results for operational KPIs, demonstrating close alignment with actual values

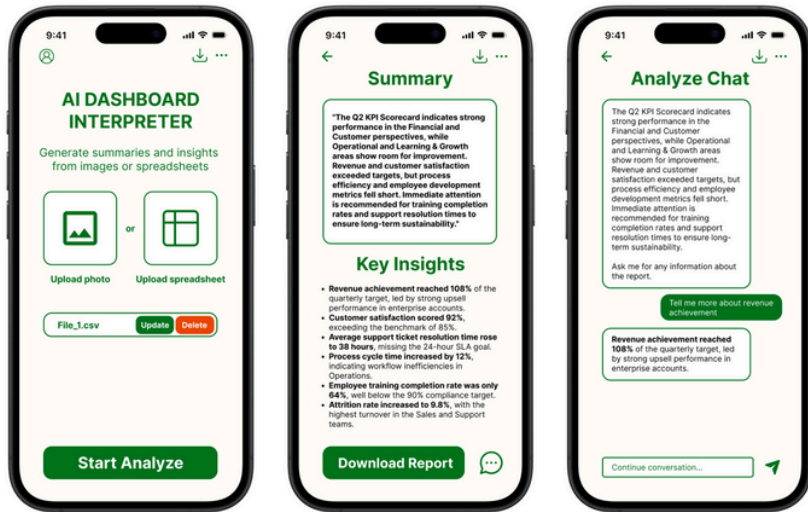
KPI	MAE	MAPE (%)	R ²
sla_violation	0.00	0.00	1.00
support_cost	15341.94	0.90	0.98
csat_score	0.47	0.34	0.97
oper_ratio	0.12	0.52	0.93
conversion_rate_trend	11.43	94.08	0.92
aha_revenue_trend	10976.63	170.44	0.88
opex_ratio_lag_2	0.14	0.60	0.88
repeat_customer_rate_lag_2	7.75	1.28	0.88
repeat_customer_rate_trend	11.52	41.16	0.87
uptime_rate_trend	21.59	380.89	0.85
unexpected_risk_cost_rolling_mean	1097.86	2.41	0.85
delivery_cost_ma	1323.53	0.54	0.85
unexpected_risk_cost_ma	1089.51	2.43	0.83
uptime_rate_lag_2	8.21	0.28	0.83
delivery_time_rolling_mean	3.44	0.25	0.83
uptime_rate_lag_1	0.38	0.29	0.82
delivery_time_ma	4.65	0.34	0.82
revenue_from_release_lag_2	5537435.15	2.70	0.82
revenue_attributed_trend	6863170.86	42.83	0.82
delivery_time_trend	21.88	70.17	0.81
support_cost_ma	43984.24	2.59	0.80
opex_ratio_lag_1	0.20	0.88	0.79
...			
first_contact_resolution_rate_ma	21.68	0.95	-1.63
uptime_rate_ma	14.05	0.46	-2.29
delivery_cost_rolling_std	4225.51	74.51	-9.27

Caption: Performance summary of trained regression models across multiple KPIs.

METHODOLOGY

Our approach followed a **wave-based MVP** process:

- KPI Dictionary Design Workshops** across 7 departments
- Power BI Dashboards** with automated SQL integration & refresh logic
- AI Dashboard Interpreter** (mobile + web)
- OpenAI Assistant** for both OCR from dashboard screenshots and structured spreadsheet parsing — all handled automatically without manual preprocessing
- Iterative Feedback Loops** at each delivery stage to refine functionality



Caption: Mobile AI Dashboard Interpreter for uploading KPI dashboards (images or spreadsheets) and receiving instant summaries and insights.

DELIVERABLES

- Department-Specific KPI Dictionary**
 - Contains **40+ validated KPIs** covering **Operations, Sales, Customer Support, Technology, Product, Marketing, and Finance & Accounting**.
 - Each KPI entry includes:
 - Precise formula** for calculation
 - Update frequency** (daily, weekly, monthly)
 - Data owner** and department responsibility
 - Criticality rating** for prioritization
 - Developed through **cross-departmental workshops** to ensure alignment with both operational needs and strategic goals.
- Real-Time Power BI Dashboards**
 - Custom dashboard** for each department with interactive charts, scorecards, and drill-down capabilities.
 - Visual indicators for **SLA compliance, customer satisfaction, delivery performance, and financial efficiency**.
 - Automated SQL-based data integration with **scheduled refresh logic**, ensuring minimal manual intervention.
- AI Dashboard Interpreter (Android & iOS)**
 - Mobile application enabling managers to upload:
 - KPI dashboard screenshots (image-based inputs)
 - Raw spreadsheet exports (CSV, XLSX)
 - Provides **instant AI-generated summaries, KPI achievement forecasts, and actionable insights**.
 - Optimized for **low-latency responses** and **offline-first mobile UI design** for field use.
- Interactive Chatbot**
 - Built on OpenAI Assistant** to allow natural language queries about uploaded files.
 - Supports both quantitative forecasting (e.g., “Will our delivery cost target be met this month?”) and qualitative insight extraction (e.g., “Which KPI is most at risk?”).
 - Accessible from both the mobile app and web dashboard.
- Full Documentation & Governance Plan**
 - User guides, admin manuals, and training materials for onboarding new staff.
 - Governance framework detailing:
 - KPI ownership per department
 - Dashboard maintenance schedules
 - Data quality assurance processes
 - Designed for **self-sustaining management** post-handover without vendor dependency.

FUTURE WORK

- Expand KPI Coverage**
- Advanced Trend Analysis & Anomaly Detection**
- Multi-File Batch Analysis**
- Deeper Integration with Operational Databases**
- Department-Level AI Assistants (Future Vision)**

