E-commerce Business Intelligence Dashboard: Regional P&L & Operations

(跨境电商业务看板: 区域损益与运营分析 - Kuàjìng diànshāng yèwù kànbǎn: Qūyù sǔnyì yǔ yùnyíng fēnxī)

1. Project Overview (项目概况 - Xiàngmù gàikuàng)

This project features a comprehensive BI solution for a multinational consumer electronics brand (Model Alpha X). It monitors **Gross Merchandise Value (GMV)** and **Profit & Loss (P&L)** across Southeast Asian markets (Singapore, Malaysia, etc.) and platforms (Shopee, Lazada).

- **Industry:** Consumer Electronics / E-commerce.
- **Objective:** To provide real-time visibility into SKU-level profitability and operational efficiency.

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2. Data Sources & Departmental Collaboration

To build this dashboard, data integration from the following departments is required:

Department (部门 - Bùmén)	**Data Provided (数据提供 - Shùjù tígōng)**	**Strategic Value (战略价值 - Zhànlüè jiàzhí)**
Sales (销售 - Xiāoshòu)	Order Volume, **GMV**, **ASP** (Average Selling Price).	Tracks market share and revenue growth.
Finance (财务 - Cáiwù)	**COGS** (成本 - Chéngběn), Tax, Net Margin.	Evaluates the actual "bottom line" at the SKU level.
Marketing (营销 - Yíngxiāo)	Promotion Costs, Voucher Spend, Ads ROI.	Measures the efficiency of marketing burn vs. return.
Logistics (物流 - Wùliú)	Shipping Fees, Return Rates (退货率 - Tuìhuò lǜ).	Identifies operational leaks and logistics overhead.

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3. Key Performance Indicators (核心指标 - **Héxīn zhǐbiāo)**

A. Revenue & Scale (营收与规模 - Yíngshōu yǔ guīmó)

- **Payment Amount (支付金额 - Zhīfù jīn'é):** Total revenue captured at checkout.
- **ASP (单台收入 - Dān tái shōurù):** Revenue per unit. Crucial for monitoring premiumization or discounting trends.
- **Order Volume (支付数量 - Zhīfù shùliàng):** High volume indicates market penetration.

B. Profitability Analysis (损益分析 - Sǔnyì fēnxī)

- **Gross Margin (毛利率 - Máolì lǜ):** Revenue minus cost of goods.
- **Net Margin (净利率 - Jìnglì lǜ):** The final profit after taxes, marketing, and logistics.
    - *Strategic Note:* SKUs marked in red indicate negative margins, requiring immediate price adjustment or cost-cutting.
- **Platform Fees (平台费用 - Píngtái fèiyòng):** Commissions and service fees paid to Shopee/Lazada.

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4. Strategic Insights (战略洞察 - Zhànlüè dòngchá)

- **Channel Optimization:** By comparing **Shopee-Model Alpha X** vs. **Lazada-X** the management can reallocate inventory to the platform with higher **Net Margin** rather than just higher **GMV**.
- **Cost Control:** Monitoring **Logistics Unit Cost (单台物流成本 - Dān tái wùliú chéngběn)** helps in renegotiating contracts with 3PL providers if shipping spikes occur in specific regions like Singapore.
- **Product Lifecycle Management:** Using the **Trend Analysis (趋势分析 - Qūshì fēnxī)**, the brand can predict when a model (e.g., Model Alpha X, X series) is entering a decline phase and clear stock before it becomes "dead inventory."

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5. Technical Stack (技术栈 - Jìshù zhàn)

- **Visualization:** Power BI / Tableau.
- **Data Processing:** Python (Pandas) for ETL; SQL for querying the Data Warehouse.
- **Strategy:** Data-driven decision making (DDDM) for cross-border trade.

To make your GitHub repository stand out to global recruiters while maintaining the original context of the dashboard, here is the technical documentation in **English** with **Chinese (Pinyin)** integrated.

Technical Implementation: SQL & Power BI DAX

(技术实现: SQL 与 Power BI DAX - Jìshù shíxiàn: SQL yǔ Power BI DAX)

1. SQL: Data Modeling & ETL

To build a scalable dashboard, we first design a **Star Schema**. The core is the Fact_Sales table, which aggregates data from multiple e-commerce platforms.

```
SQL
-- Create Fact Table for E-commerce P&L
-- 建立损益事实表 (Jiànlì sǔnyì shìshí biǎo)
CREATE TABLE Fact_Sales (
    Order_Date DATE,
    Region VARCHAR(50),          -- 区域 (Qūyù)
    Channel VARCHAR(50),         -- 渠道 (Qúdào)
    SKU_Name VARCHAR(100),       -- 产品名称 (Chǎnpǐn míngchēng)
    Units_Sold INT,              -- 支付数量 (Zhīfù shùliàng)
    Gross_Revenue DECIMAL(18,2),  -- 支付金额 (Zhīfù jīn'é)
    COGS DECIMAL(18,2),          -- 成本 (Chéngběn)
    Marketing_Fee DECIMAL(18,2),  -- 营销费用 (Yíngxiāo fèiyòng)
    Logistics_Fee DECIMAL(18,2),  -- 物流费用 (Wùliú fèiyòng)
    Platform_Fee DECIMAL(18,2)    -- 平台费用 (Píngtái fèiyòng)
);

-- Core Analytical Query for Dashboard
-- 核心分析查询 (Héxīn fēnxī cháxún)
SELECT
    SKU_Name,
    SUM(Units_Sold) AS Total_Units,
    SUM(Gross_Revenue) / SUM(Units_Sold) AS ASP, -- 单台收入 (Dān tái shōurù)
    SUM(Gross_Revenue - COGS) AS Gross_Profit,   -- 毛利 (Máolì)
    SUM(Gross_Revenue - COGS - Marketing_Fee - Logistics_Fee - Platform_Fee) AS
Net_Profit -- 净利 (Jìnglì)
FROM Fact_Sales
GROUP BY SKU_Name;
```

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2. Power BI: DAX Measures

In Power BI, we use **Measures** for dynamic calculation. This allows the dashboard to update instantly when you toggle the **Slicers (筛选器 - Shāixuǎn qì)**.

A. Average Selling Price (ASP) | 单台收入 (Dān tái shōurù)

```
Code snippet
ASP = DIVIDE(SUM(Fact_Sales[Gross_Revenue]), SUM(Fact_Sales[Units_Sold]), 0)
```

B. Gross Margin % | 毛利率 (Máolì lǜ)
Calculates profitability before operating expenses.

Code snippet
```
Gross Margin % =
VAR GrossProfit = SUM(Fact_Sales[Gross_Revenue]) - SUM(Fact_Sales[COGS])
RETURN DIVIDE(GrossProfit, SUM(Fact_Sales[Gross_Revenue]), 0)
```

C. Net Margin % | 净利率 (Jìnglì lǜ)
The most critical metric in your dashboard. It reflects the final profit after all costs.

Code snippet
```
Net Margin % =
VAR TotalCosts = SUM(Fact_Sales[COGS]) + SUM(Fact_Sales[Marketing_Fee]) +
                 SUM(Fact_Sales[Logistics_Fee]) + SUM(Fact_Sales[Platform_Fee])
VAR NetProfit = SUM(Fact_Sales[Gross_Revenue]) - TotalCosts
RETURN DIVIDE(NetProfit, SUM(Fact_Sales[Gross_Revenue]), 0)
```

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3. Visualization Configuration

To replicate the Model Alpha X dashboard style, apply these professional settings:

Visual Element	**Feature**	**Purpose**
KPI Cards	Top Header	Shows **Total GMV**, **ASP**, and **Net Margin** at a glance.
Matrix Table	**Comprehensive Analysis (综合分析)**	Lists all SKUs with **Conditional Formatting** (Red for Negative Net Margin).
Area Chart	**Trend Analysis (趋势分析)**	Tracks the correlation between **Sales Growth** and **Profitability** over time.

Slicers	Region & Channel	Allows deep-dives into OOspecific markets like **Singapore (新加坡)** or **Malaysia (马来西亚)**.

Strategic KPI Framework & Operational Matrix

(战略指标框架与运营矩阵 - Zhànlüè zhǐbiāo kuàngjià yǔ yùnyíng jǔzhèn)

To build this dashboard, you must simulate the flow of data across a corporate structure. Each department owns a specific part of the **P&L (Profit & Loss)** equation.

1. The Operational Formula Tree (运营公式树 - Yùnyíng gōngshì shù)

The dashboard's intelligence lies in how it breaks down **Net Margin**. Here is the mathematical logic you should document in your project:

$$Net\ Margin = GMV - COGS - Marketing\ Spend - Logistics\ Costs - Platform\ Fees$$

Metric (指标 - Zhǐbiāo)	**Formula (公式 - Gōngshì)**	**Department Owner (责任部门)**	**Operational Impact**
ASP (单台收入)	$Gross\ Revenue / Units\ Sold$	**Sales / Pricing**	Determines market positioning (Premium vs. Budget).
Gross Margin % (毛利率)	$(Revenue - COGS) / Revenue$	**Supply Chain / Procurement**	Measures manufacturing & sourcing efficiency.
Marketing Ratio (营销比)	$Marketing\ Expenses / Revenue$	**Marketing / Growth**	Evaluates if you are "buying" growth too dearly.
Logistics Unit Cost (单台物流成本)	$Total\ Shipping / Units\ Sold$	**Logistics / Ops**	Identifies inefficiencies in the "Last Mile" delivery.

Net Margin % (净利率)	$Net\ Profit / Revenue$	**Finance / Management**	The "North Star" metric for business sustainability.

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2. Departmental Synergy & Data Flow

(部门协同与数据流 - Bùmén xiétóng yǔ shùjù liú)

In a professional setting, the dashboard acts as a "Single Source of Truth."

- **Marketing Department (市场部 - Shìchǎng bù):** Uses the **Trend Analysis (趋势分析)** to see if a 12.12 Sale or a Product Launch actually increased the *Net Profit* or just the *GMV*.
- **Supply Chain (供应链 - Gōngyìngliàn):** Monitors **Inventory Turnover** and **COGS**. If the Gross Margin drops, they must renegotiate with factories or 3PL (Third-party logistics) providers.
- **Product Team (产品部 - Chǎnpǐn bù):** Analyzes **SKU Performance**. They decide which models to "End of Life" (EOL) based on the **Comprehensive Analysis (综合分析)** table if a product consistently shows a "Red" (negative) Net Margin.

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3. Operational Strategies for your Report

(运营策略 - Yùnyíng cèlüè)

On your GitHub, explain the **"So What?"** (The action taken based on the data):

- **Strategy A: High GMV, Low Net Margin.**
  - *Insight:* The product is popular but the "Voucher" or "Shipping" costs are eating the profit.
  - *Action:* Reduce aggressive discounting; shift to "Bundle Deals" to increase the **AOV (Average Order Value)** and spread the fixed shipping cost.
- **Strategy B: Low GMV, High Net Margin.**
  - *Insight:* This is a "Niche" or "Premium" product with high efficiency.
  - *Action:* Increase Marketing Spend (Ad placement) to scale this product since every new sale adds significant profit.

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4. Power BI Implementation: The "Departmental" Folder Structure

When organizing your Power BI file (the .pbix), group your measures into folders to reflect the corporate structure:

- **[01_Sales_Metrics]:** Total_GMV, ASP, Order_Count.
- **[02_Marketing_Eff]:** ROI, Ad_Spend_Ratio, Voucher_Absorption.
- **[03_Supply_Chain]:** Unit_COGS, Inbound_Cost.
- **[04_Profitability]:** Gross_Margin_%, Net_Margin_%, Break_even_Units.

Strategic Insights & Executive Actions

(决策洞察与行动建议 - Juécè dòngchá yǔ xíngdòng jiànyì)

1. SKU Profitability Portfolio (产品盈利组合 - Chǎnpǐn yínglì zǔhé)

The Insight: Your dashboard shows several SKUs with **Negative Net Margins (**净利率为负 **- Jìnglì lǜ wèi fù)** despite having high **GMV**.

- **Analysis:** High-volume models (e.g., Model Alpha X M-series) often suffer from "Profit Erosion" due to aggressive voucher usage and high platform commissions.
- **Take Action:**
    - **Optimization:** Implement a "Voucher Cap" for low-margin SKUs.
    - **Pivot:** Shift marketing budget (Ad Spend) from "Loss Leaders" to "Profit Drivers" (e.g., Model Alpha X F-series) that show a **Net Margin > 10%**.

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2. Channel & Regional Efficiency (渠道与区域效率 - Qúdào yǔ qūyù xiàolǜ)

The Insight: Comparing **Shopee** vs. **Lazada** in the **Singapore** market.

- **Analysis:** One channel might have a higher **ASP (**单台收入**)** but lower **Net Margin** due to higher **Logistics Fees (**物流费用**)** or platform service fees.
- **Take Action:**
    - **Logistic Renegotiation:** If Singapore's logistics unit cost is 15% higher than the regional average, renegotiate with 3PL providers or switch to "Fulfilled by Shopee/Lazada" (FBS/FBL) to lower per-unit costs.
    - **Price Parity:** Adjust prices dynamically across channels to maintain a consistent **Net Margin** target.

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3. Marketing Burn vs. Return (营销投入产出 - Yíngxiāo tóurù chǎnchū)

The Insight: Observing the **Trend Analysis (**趋势分析**)** peaks during promotion periods (e.g., 1.1 or 12.12).

- **Analysis:** If the **GMV** curve spikes but the **Net Margin** curve stays flat or dips, the promotion is "buying revenue" but destroying value.
- **Take Action:**
    - **ROI-Driven Marketing:** Stop "Blanket Discounts" (everyone gets 20% off). Switch to "Tiered Discounts" (e.g., Save $50 only when spending $500) to increase the **AOV (Average Order Value)**.
    - **CRM Focus:** Retarget existing customers via EDM/Push notifications to reduce the **CAC (Customer Acquisition Cost)**.

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4. Supply Chain & Inventory Health (供应链与库存健康 - Gōngyìngliàn yǔ kùcún jiànkāng)

The Insight: High **COGS (成本)** as a percentage of revenue on older models.

- **Analysis:** As models age, their market price drops faster than their production cost, leading to "Margin Squeeze."
- **Take Action:**
    - **Inventory Clearance:** For SKUs with **Net Margin < 2%**, initiate a "Flash Sale" to liquidate stock and free up warehouse space for newer, high-margin models.
    - **Bundle Strategy:** Pair low-margin phones with high-margin accessories (cases, buds) to increase the overall **Basket Margin**.

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5. Summary Table for GitHub README

Finding (发现 - Fāxiàn)	**Root Cause (根本原因)**	**Strategic Action (战略行动)**	**Department**
Negative Net Margin	High Voucher Absorption	Set ROI floor for all promotions	Marketing
ASP Decline	Intense Price War	Launch "Bundle Deals" to raise AOV	Sales
Logistics Spike	Last-mile inefficiency	Audit 3PL performance in SG/MY	Logistics
GMV Growth but Profit Dip	Scaling "Loss Leaders"	Reallocate budget to high-margin SKU	Finance

1. Data Schema Architecture

(数据架构 - Shùjù jiàgòu)

Chúng ta sử dụng mô hình **Star Schema** để tối ưu hóa hiệu suất truy vấn.

A. Dim_Product (产品维度表 - Chǎnpǐn wéidù biǎo)

- **Product_ID (PK):** Unique ID cho từng sản phẩm.
- **Model_Name:** Tên model ẩn danh (Ví dụ: Apex Alpha, Zenith X).
- **Category:** Phân khúc (Flagship, Mid-range, Entry-level).

B. Dim_Market (市场维度表 - Shìchǎng wéidù biǎo)

- **Market_ID (PK):** Mã định danh cửa hàng/quốc gia.
- **Region:** Khu vực (SG, MY, VN, PH).
- **Platform:** Kênh bán hàng (Platform A, Platform B).

C. Fact_P&L (损益事实表 - Sǔnyì shìshí biǎo)

Đây là bảng chứa dữ liệu giao dịch chi tiết:

- **Transaction_ID (PK):** Mã giao dịch.
- **Product_ID (FK):** Khóa ngoại nối với Dim_Product.
- **Market_ID (FK):** Khóa ngoại nối với Dim_Market.
- **Date:** Ngày giao dịch.
- **Order_Volume:** Số lượng (支付数量 - Zhīfù shùliàng).
- **Gross_Revenue:** Doanh thu gộp (支付金额 - Zhīfù jīn'é).
- **COGS:** Giá vốn hàng bán (成本 - Chéngběn).
- **Total_OpEx:** Chi phí vận hành (运营 chi phí - Yùnyíng chípái) bao gồm Marketing & Logistics.

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2. Core Business Logic (DAX/SQL)

(核心业务 liên kết - Héxīn yèwù liánjié)

Sử dụng các công thức này để tạo Dashboard:

1. **Net Revenue (净营收 - Jìng yíngshōu):** `Net_Revenue = Gross_Revenue - Discounts - Returns`
2. **Net Profit (净利润 - Jìng lìrùn):** `Net_Profit = Net_Revenue - COGS - OpEx - Platform_Fees`
3. **Net Margin % (净利率 - Jìnglì lǜ):** `Net_Margin_% = DIVIDE(Net_Profit, Net_Revenue, 0)`

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3. Insight & Action Summary

(洞察与行动 - Dòngchá yǔ xíngdòng)

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4. Technical Stack

- **Database:** SQL (Data Modeling, PK/FK constraints).
- **ETL:** Python (Anonymizing real data & generating dummy sets).
- **BI Tool:** Power BI (DAX, Interactive Visualization).