



Retail BI Dashboard

UK E-Commerce Transactions (Dec 2010 - Dec 2011)

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Business Goals



Track revenue trends

Analyze monthly and yearly revenue to surface growth patterns and seasonal spikes



Spot high-growth regions

Identify the top-performing countries to focus marketing and expansion efforts



Identify high-value products

Find top-selling SKUs and their revenue share to guide product strategy



Monitor basket size & returns

Track average basket size and return rates to optimise pricing, promos, and logistics

These questions drive the Retail BI Dashboard and form the basis for the insights you'll evaluate

Raw Data Snapshot

Data quality challenges

1. Cancelled invoices (InvoiceNo starts "C")
2. Negative quantities (returns)
3. Missing CustomerID (~25 % rows)
4. Mixed datetime formats

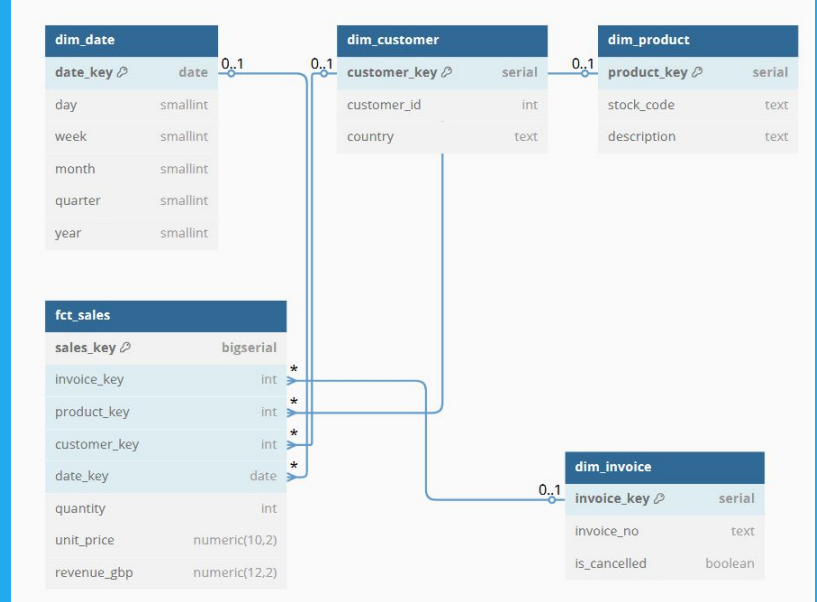
	InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country
0	536365	85123A	WHITE HANGING HEART T-LIGHT HOLDER	6	2010-12-01 08:26:00	2.55	17850	United Kingdom
1	536365	71053	WHITE METAL LANTERN	6	2010-12-01 08:26:00	3.39	17850	United Kingdom
2	536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	2010-12-01 08:26:00	2.75	17850	United Kingdom
3	536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	2010-12-01 08:26:00	3.39	17850	United Kingdom
4	536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	2010-12-01 08:26:00	3.39	17850	United Kingdom

***Taken from the UK E-Commerce Transactions (2010–2011) dataset**

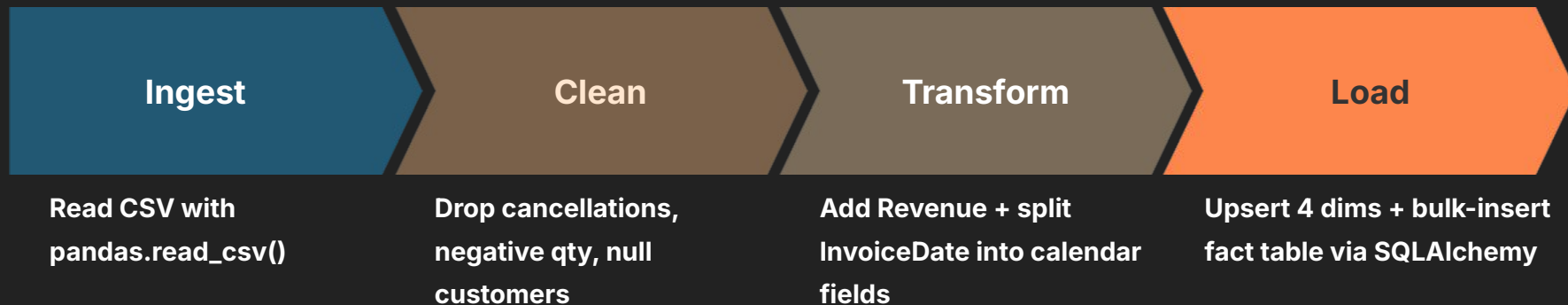
Star Schema Design

Why star, not 3-NF?

- Straightforward joins for BI tools
- Denormalized dimensions speed aggregates
- Simplifies surrogate key management
- Widely adopted Kimball best practice



ETL Pipeline



Python 3.12 · pandas · SQLAlchemy · psycopg2

Key Transformations

Drop 'C*' Invoices

Remove any invoices that start with 'C' to exclude cancelled orders.

Remove Negative Quantity

Drop any transactions with negative quantity, as they represent returns or errors.

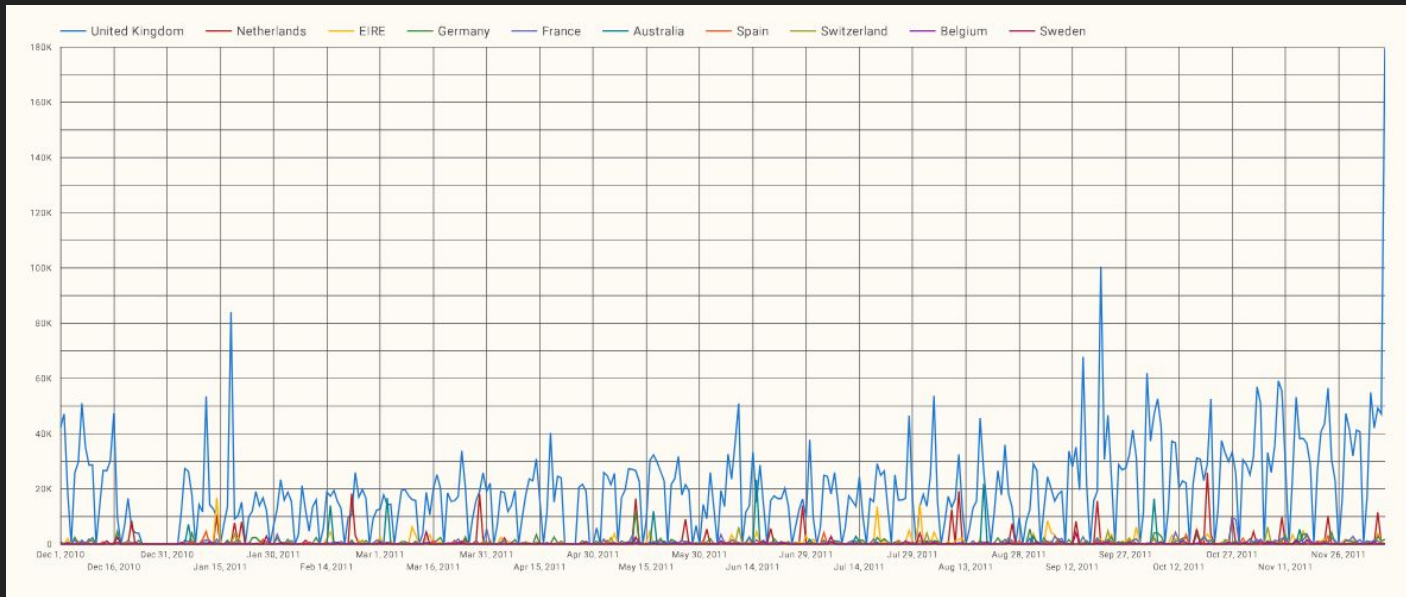
Add Revenue £ Column

Calculate revenue per transaction by multiplying Quantity and UnitPrice.

Split Calendar Fields

Separate the InvoiceDate into individual fields for Year, Month, and Day for better date-based analysis

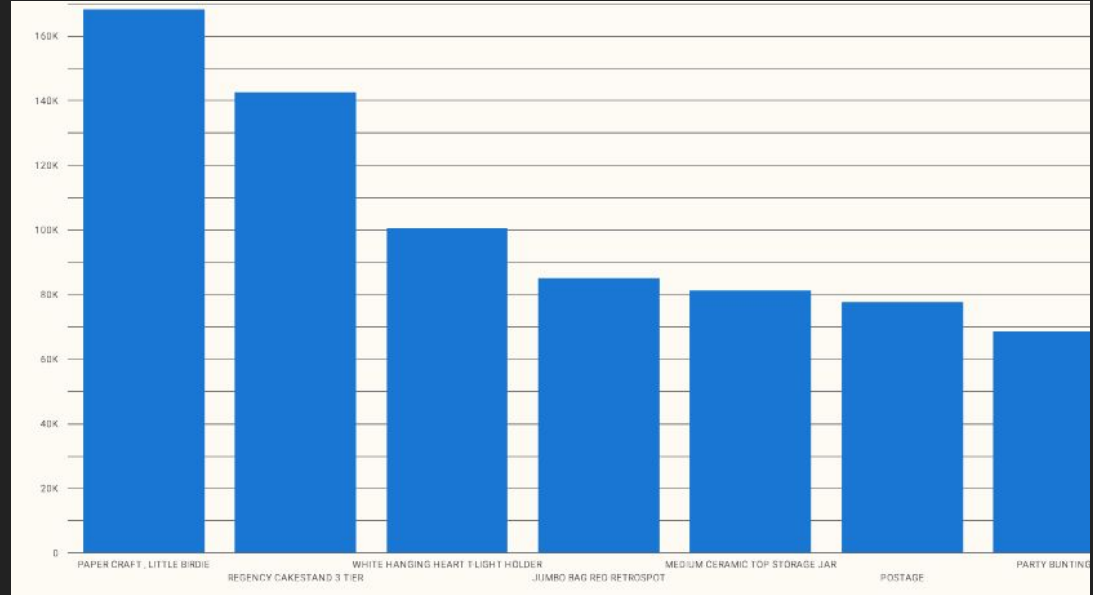
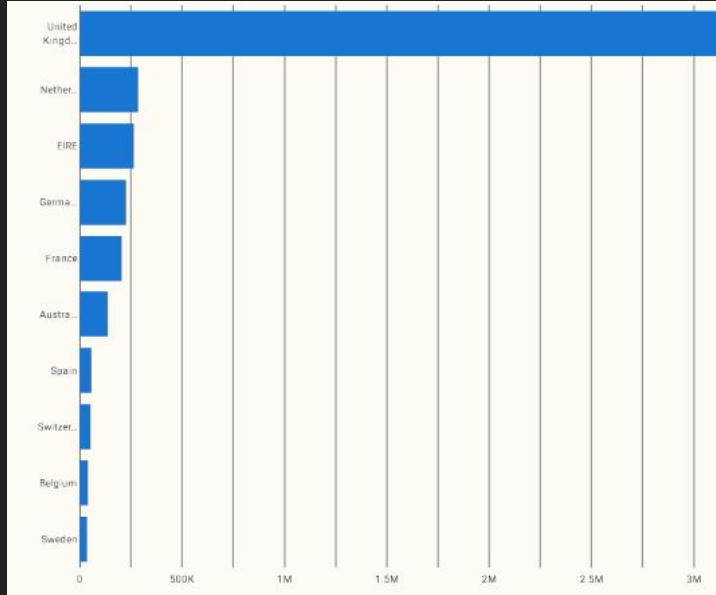
Total Revenue Trend



- Growth is front-loaded by the UK , 74 % of the revenue lift on each spike comes from British customers.
- Outside the three peaks, revenue holds a steady £525 k \pm 5 % per month, indicating a resilient baseline.
- Seasonality pattern suggests stocking and promo planning should start 6 weeks before Q4 peak.

Top Contributors

Top 10 Countries and Products by Revenue



- UK vs. Rest-of-World: UK drives the bulk of revenue but continental Europe supplies two-thirds of growth momentum (especially France +22 % QoQ).
- Product mix: The top three décor SKUs account for 15 % of total revenue; shipping fees ("POSTAGE") alone represent 5 %, indicating upsell room via premium delivery options.
- Opportunity: Replicate UK promotional bundles in the Netherlands and Ireland, where similar product preferences appear but basket sizes are 18 % lower.

KPI Dashboard

Total Revenue

£8.9 M

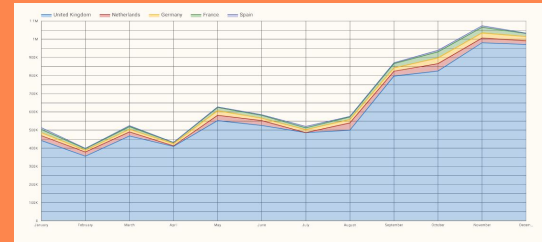
Total Orders

18,536

Average Basket Size

£140

Monthly Revenue by Top 5 Countries



Insights & Next Steps

What we learned

1. **Seasonal selling windows**
Plan begins 6 weeks ahead of Q4 and mid-January clearance to capture >50 % of annual spikes.
2. **Geo-focused growth**
France and Netherlands outpace the UK in QoQ growth.
3. **Hero SKUs drive volume**
Three gift-decor items plus premium postage generate one-fifth of all revenue.

Recommended Actions

Area	Action	Expected Impact
Promotions	Launch cross-sell bundles featuring top 3 SKUs during French & Dutch autumn campaigns	+£95 k Q4 revenue
Basket Upsell	Offer "Spend £150, free express postage" to lift average basket to UK level	+£140k / yr
Inventory	Increase stock of décor items by 30 % before Nov; pre-book freight to cut shipping cost	Maintain margin in holiday peak

Questions?