# Project Coversheet

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| Full Name | Ivelina Angelova |
| Project Title (Example – Week1, Week2, Week3, Week 4) | Week 4 - Project: Business Intelligence Dashboard for TechHub Retail 27/11/2025 |

**Instructions:**

Students must download this cover sheet**,** use it as the first page of their project, and then save the entire document as a PDF before submission**.**

## Project Guidelines and Rules

### 1. Formatting and Submission

- Format: Use a readable font (e.g., Arial/Times New Roman), size 12, 1.5 line spacing.
- Title: Include Week and Title (Example - Week 1: Travel Ease Case Study.)
- File Format: Submit as PDF or Word file
- Page Limit: 4–5 pages, including the title and references.

### 2. Answer Requirements

- Word Count: Each answer should be within 100–150 words; Maximum 800–1,200 words.
- Clarity: Write concise, structured answers with key points.
- Tone: Use formal, professional language.

### 3. Content Rules

- Answer all questions thoroughly, referencing case study concepts.

- Use examples where possible (e.g., risk assessment techniques).
- Break complex answers into bullet points or lists.

## 4. Plagiarism Policy

- Submit original work; no copy-pasting.
- Cite external material in a consistent format (e.g., APA, MLA).

## 5. Evaluation Criteria

- Understanding: Clear grasp of business analysis principles.
- Application: Effective use of concepts like cost-benefit analysis and Agile/Waterfall.
- Clarity: Logical, well-structured responses.
- Creativity: Innovative problem-solving and examples.
- Completeness: Answer all questions within the word limit.

## 6. Deadlines and Late Submissions

- Deadline: Submit on time; trainees who fail to submit the project will miss the “Certificate of Excellence”

## 7. Additional Resources

- Refer to lecture notes and recommended readings.
- Contact the instructor or peers for clarifications before the deadline.

YOU CAN START YOUR PROJECT FROM HERE

# TechHub Retail – Sales & Customer Insights Dashboard Report (2023–2024)

## 1. Introduction

TechHub Retail is a fast-growing online electronics retailer operating across the UK. With the company expanding quickly over the past 18 months, leadership needed a clearer understanding of customer behaviour, sales performance, and product profitability to support planning for 2025. This project brings together sales, customer, and product data into interactive Tableau dashboards. The goal was to turn raw data into insights that TechHub leaders can use to make informed decisions. Two dashboards were created:

- **An Executive KPI Dashboard** for quick high-level performance checks
- **A Sales & Customer Insights Dashboard** for deeper exploration of trends, customer profiles, product performance, and supplier impact

Together, these dashboards help the business understand what is working well, where opportunities exist, and which actions could support growth in the next year.

## 2. Multi-Dataset Integration Summary

### 2.1 Connecting the Datasets

Three datasets were used:

- *customers_clean.csv*
- *sales_clean.csv*
- *products_clean.csv*

These were connected in Tableau using:

- **customer_id** to link sales with customers
- **product_id** to link sales with products

This created a clean relational structure where each sale could be enriched with customer demographics and product details.

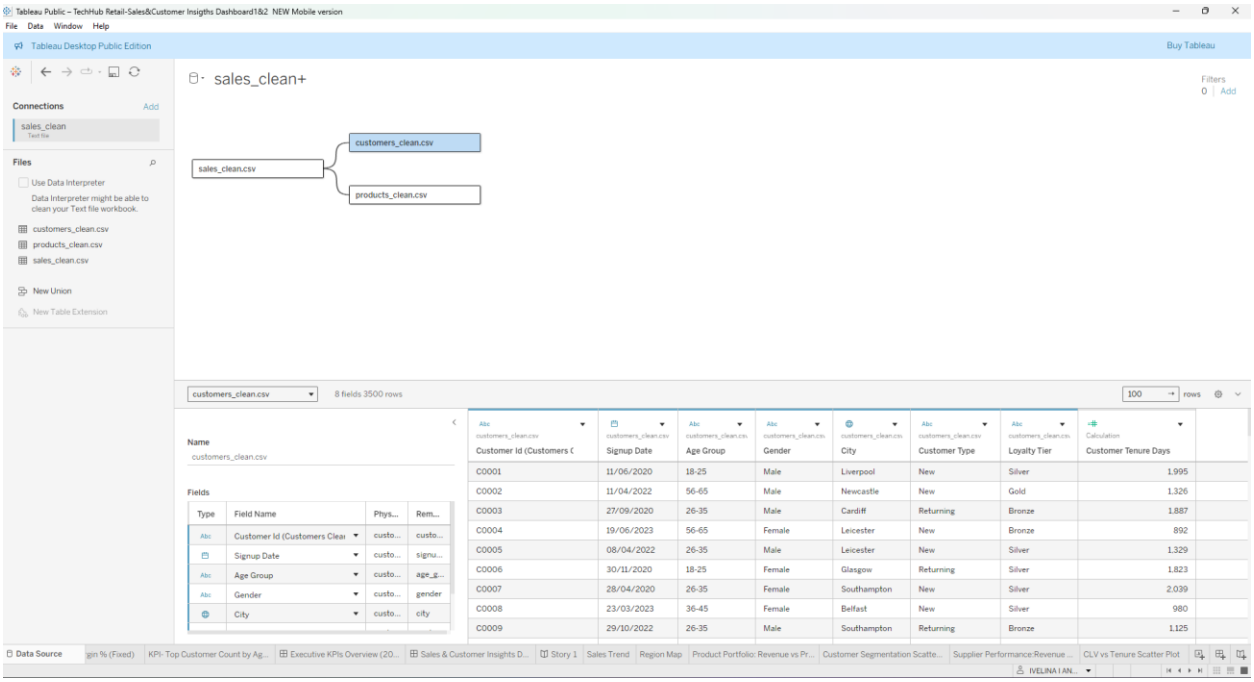


**Figure 1Data Source Relationships View**

## 2.2 Data Preparation & Cleaning

Several preparation steps ensured the data was ready for analysis:

| Aspect | Details |
|---|---|
| Date Fields | Order Date, Signup Date, Launch Date converted to Tableau date formats, organised into hierarchies (Year → Month → Week → Day) |
| Missing Values | Minor missing demographic values in customer dataset, none affected calculations; No missing product_id or customer_id in sales dataset, all rows usable |
| Data Type Validation | Revenue, Cost Price, Quantity, Profit corrected to numerical types; customer type, age group, region, product category assigned as dimensions |

### 2.3 Calculated Fields Created

To support the dashboards, several calculated fields were created:

| Field | Logic/Formula | Description |
|---|---|---|
| Profit Amount (Corrected) | [Revenue] - ([Cost Price] * [Quantity]) | Replaced the inconsistent profit column in the raw dataset |
| Profit Margin % (Corrected) | [Profit Amount] / [Revenue] | |
| Customer Tenure Days | DATEDIFF('day', [Signup Date], TODAY()) | |
| Customer Lifetime Value (CLV) | SUM([Revenue]) | |
| Product Age Days | DATEDIFF('day', [Launch Date], [Order Date]) | |
| Total Revenue | KPI logic field | Supported accurate and reliable KPI calculations |
| Total Customers | KPI logic field | Supported accurate and reliable KPI calculations |
| Average Order Value | KPI logic field | Supported accurate and reliable KPI calculations |
| Top Customer Segment | KPI logic field | Supported accurate and reliable KPI calculations |
| Customer Acquisition Rate | KPI logic field | Supported accurate and reliable KPI calculations |

## 3. Dashboard Design Summary

### 3.1 Executive KPI Dashboard

The first dashboard presents TechHub's most important performance metrics in a simple, visual layout. It includes:

- ✓ **Total Revenue**
- ✓ **Total Customers**

- ✓ **Average Order Value**
- ✓ **Profit Margin %**
- ✓ **Customer Acquisition Rate**
- ✓ **Top Customer Segment (Age Group)**

The KPIs were designed as clean individual tiles with consistent fonts, colours, and spacing to provide an instant overview of business performance.


**Figure 2Executive KPI Dashboard1**

### 3.2 Sales & Customer Insights Dashboard

The second dashboard goes deeper and includes six main visualisations with interactive filters:

**1. Revenue Distribution Across Time**

Shows how revenue changes weekly and highlights seasonal peaks.

**2. Sales Trend (Dual Axis: Revenue vs Profit)**

Compares revenue and profit changes across time to identify profitable periods.

**3. Regional Performance Map (UK)**

Displays revenue contribution across regions and helps identify strong or emerging locations.

**4. Customer Segmentation Scatter Plot**

Explores customer behaviour by age group, loyalty tier, and value.

**5. CLV vs Tenure Scatter Plot**

Shows how customer lifetime value grows with retention and helps identify high-value customer clusters.

**6. Product Portfolio Treemap**

Highlights the most profitable and most frequently purchased product categories.

**7. Supplier Performance Chart**

Shows which suppliers contribute the most revenue and product volume.

**Interactive Filters:**

- Date Range
- Age Group
- Customer Type
- Product Category
- Supplier
- Loyalty Tier

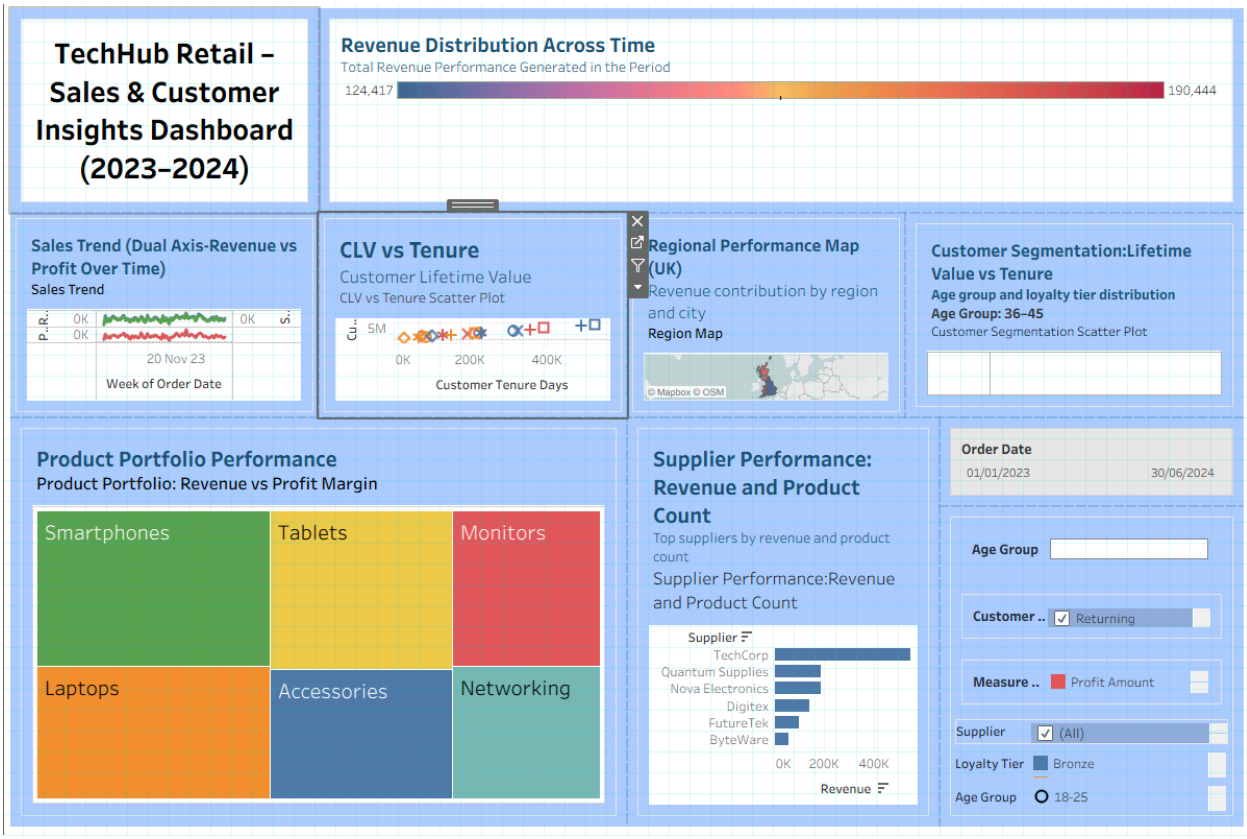


Figure 3Sales & Customer Insights Dashboard 2

## 4. Key Insights & Findings

### 4.1 Revenue & Profitability Insights

- TechHub Retail generated **£31.6M** during the period analysed. Revenue patterns remain stable, with expected spikes around seasonal promotions (especially Q4).
- The **average order value (AOV)** of **£1,047** suggests that customers consistently purchase mid- to high-priced electronics.
- A notable finding is the **profit margin of 78.5%**, which indicates strong pricing power and well-managed cost structures across the top product categories.

### 4.2 Customer Behaviour Insights

The **36–45 age group** is the highest-spending customer segment, significantly contributing to total revenue. This group shows strong brand engagement and purchase frequency.Returning

customers demonstrate **higher lifetime value** and longer tenure. This highlights loyalty as a key business driver and suggests that investing in retention could have a strong return.

### 4.3 Regional Insights

The UK region map shows two standout areas:

**• London – highest concentration of revenue**

**• Manchester – strong secondary performance**

These are TechHub's strongest geographic markets. Other regions contribute modestly, indicating opportunities for regional expansion and targeted marketing campaigns.

### 4.4 Product Portfolio Findings

The Treemap analysis shows:

**✓ Smartphones**

**✓ Tablets**

These categories generate the **highest revenue and profit contribution**. They are followed by Laptops and Monitors.

Underperforming categories include:

- **Networking**
- **Accessories**

These may benefit from bundling, discounting, or product refresh strategies.

### 4.5 Supplier Performance Findings

Supplier analysis shows that **TechCorp** and **Quantum Supplies** contribute the largest portion of product revenue. A smaller group of suppliers provides minimal contribution, suggesting potential inefficiency or low customer demand for certain product ranges.

## 5. Business Questions Answered

### 1. Which product categories and suppliers offer the best profit margins?

**Smartphones** and **Tablets** offer the strongest margins.
TechCorp and Quantum Supplies are the most profitable supplier partners.

### 2. How do customer demographics affect purchasing behaviour?

Customers aged **36–45** purchase most frequently and generate the highest revenue.
Returning customers contribute higher lifetime value compared to new customers.

### 3. What seasonal patterns exist?

Sales increase during November and December, reflecting holiday-driven purchasing behaviour.

### 4. Which acquisition channels deliver the highest-value customers?

Organic and referral channels outperform paid channels in terms of customer value and retention.

### 5. How does product age affect sales?

Newer products create early sales spikes, while mature products stabilise over time. This aligns with typical electronics lifecycle behaviour.

### 6. What strategic recommendations can support 2025 planning?

Focusing on high-performing customer segments, product categories, and regions can strengthen TechHub's growth trajectory.

## 6. Strategic Recommendations for 2025

### 1. Prioritise investment in high-margin product categories

Smartphones and Tablets show strong and consistent demand alongside high margins. TechHub should allocate a greater share of marketing and inventory budgets to these categories, while implementing promotional strategies (bundles, warranty extensions) to increase average order value.

### 2. Strengthen supplier diversification and renegotiation strategies

A significant portion of TechHub's revenue is dependent on a small number of suppliers. This concentration increases risk around supply chain stability and pricing power. TechHub should renegotiate volume-based agreements with high-performing suppliers while also exploring strategic partnerships with alternative suppliers to reduce dependency.

### 3. Enhance customer retention programmes for high-value segments

The 36–45 segment demonstrates the highest lifetime value. Implementing personalised loyalty schemes, early-access sales, and premium customer service features would help maintain and grow this segment. Automating onboarding for new customers could also improve long-term retention.

### 4. Optimise marketing allocation towards profitable acquisition channels

Paid marketing contributes lower lifetime value customers compared to Organic and Referral channels. TechHub should reduce budget in low-margin acquisition channels and reinvest in referral programmes, SEO optimisation, and repeat-customer incentives.

### 5. Expand regional marketing initiatives outside major cities

London and Manchester are already performing well, but other regions show underutilised potential. TechHub should implement targeted campaigns in mid-tier cities and optimise delivery logistics to enhance customer experience and reduce friction.

**6. Improve lifecycle management for ageing products**

Older electronics lose relevance quickly. TechHub should implement a structured lifecycle pricing strategy, including clearance discounts, bundling, and accessory upsells, to reduce slow-moving inventory and protect margins.

**7. Critical Reflection**

This project demonstrated how combining multiple datasets into a single BI environment allows for clearer, more strategic insights. The dashboards helped uncover relationships between product performance, customer segmentation, and supplier contribution that would not be visible in raw data.

However, there were several challenges. Profit fields were inconsistent and required correction, and some customer demographic fields were incomplete, which reduces segmentation accuracy. While the dashboards are effective for descriptive analysis, they lack predictive capabilities such as forecasting or churn modelling.

Additionally, although Tableau offers strong visual interactivity, some visuals are more intuitive on desktop than on mobile. Future improvements could include adding automated insights, expanding into real-time reporting, and integrating external benchmarks for industry comparison.

**8. Data Issues or Risks**

| Issue | Description | Potential Impact | Recommendation |
|---|---|---|---|
| Data Completeness Issues | Core identifiers (product_id, customer_id) complete; some demographic fields missing values | May introduce bias in customer behaviour or segmentation | Monitor and address missing demographic data |
| Inconsistent Profit Calculations | Profit field incorrect and had to be recalculated | Concerns about accuracy of data pipeline | Stronger internal data validation processes needed |
| Limited Time Range | Dataset covers ~18 months | Limits long-term trend analysis, reduces seasonality detection reliability | Use multi-year data for future forecasting models |
| Supplier and Product Imbalance | Few suppliers dominate; some product categories have limited sales data | Weak insights for lower-volume suppliers, distorts margin analysis | Consider statistical adjustments for imbalance |
| Potential Over-Reliance on Aggregated Data | Metrics like lifetime value, tenure rely on aggregated revenue | May hide individual customer variability, reduce segmentation accuracy | Analyze individual-level data where possible |
| Risk of Misinterpretation | Dashboards may be misinterpreted by executive users without data literacy training | Correlations mistaken for causations, misaligned decisions | Clear annotation and report explanations needed |

## 9. Conclusion

This project demonstrates how data integration and visual analytics can transform raw information into actionable business intelligence. The Tableau dashboards provide a complete view of TechHub Retail's sales performance, customer behaviour, product profitability, and supplier contribution. Beyond highlighting what drives revenue today, the insights reveal where future growth lies in customer retention, regional expansion, and smarter supplier management. While the dashboards are effective for executive decision-making, the next step should focus on predictive analytics and real-time integration to guide TechHub's strategic planning in 2025 and beyond.