

Summer Projects '25

Solving Inventory
Inefficiencies Using
Advanced SQL Analytics

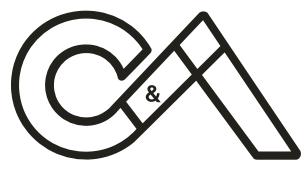
Optimizing
Revenue Leakage
and Profitability in
the Hospitality
Sector

Ethical Supply Chain
in the Electronics
Industry

Addressing
Domestic
Violence in India



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Solving Inventory Inefficiencies Using SQL

Introduction

Urban Retail Co. is a rapidly expanding mid-sized retail chain with a presence in both physical stores and online platforms. We operate across several cities and offer more than 5,000 diverse stock keeping units (SKUs), ranging from daily groceries and home essentials to electronics and personal care items. Our logistics network depends on regional warehouses that feed inventory to individual retail outlets.

With growing complexity in operations, we are struggling to maintain optimal inventory levels. While data from our sales transactions, product catalogs, and warehouse logs is available, it is underutilized, leading to significant inefficiencies in inventory management.

The Challenge

Our current issues stem from reactive, manual decision-making and a lack of integrated data analytics:

- Frequent **stockouts** of fast-moving products, resulting in missed sales and poor customer experience.
- **Overstocking** of slow-moving items, locking up working capital and increasing warehousing costs.
- Lack of **real-time insights** into SKU performance, reorder thresholds, and supplier reliability.
- **Poor visibility** across product categories, store locations, and regions.

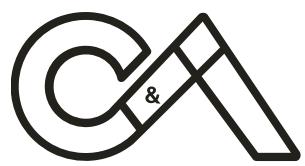
We strongly believe that leveraging SQL-based analytics can convert our raw data into actionable insights that will enhance our inventory management practices and decision-making process.

Your Mission

- As a team of aspiring data analysts, your goal is to design and implement a **SQL-driven inventory monitoring and optimization solution**. This project will simulate the core responsibilities of a data analyst in a retail setting.

You are expected to:

- Create **efficient and scalable** SQL queries to extract, transform, and analyze inventory and sales data.
- **Diagnose inefficiencies**, suggest corrective actions, and predict future needs based on data.
- Deliver both **technical outputs** (SQL scripts, schema designs) and **analytical insights** that the business can act on.



Key Tasks and Deliverables

SQL Queries

You will write and test a suite of advanced SQL queries that enable the following:

- **Stock Level Calculations** across stores and warehouses
- **Low Inventory Detection** based on reorder points
- **Reorder Point Estimation** using historical trends
- **Inventory Turnover Analysis**
- **Summary Reports** with KPIs like stockout rates, inventory age, and average stock levels

Database Optimization

- Normalize a given raw inventory dataset into a relational schema
- Apply best practices for query performance: indexing, joining, use of window functions, etc.

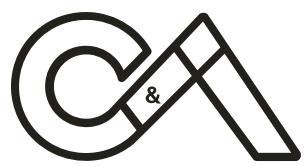
Analytical Outputs

Use your queries to produce reports and dashboards (or summaries) that

- Identify **fast-selling vs slow-moving products**
- Recommend **stock adjustments** to reduce holding costs
- Highlight **supplier performance inconsistencies**
- Forecast demand trends based on seasonal/cyclical data

What We Expect From You

- **Technical Clean**, optimized, and well-documented SQL code.
- **Analytical Thinking**: Ability to turn raw data into insights that solve real business problems.
- **Communication**: Clear presentation of findings, rationale, and business impact.
- **Creativity**: Go beyond the provided queries — suggest additional insights or visualizations we haven't considered.



Expected Business Impact

By the end of this project, your solution should help Urban Retail Co.:

- Achieve smarter inventory decisions based on actual data
- Reduce stockouts and overstocks
- Improve supply chain efficiency
- Enhance customer satisfaction and boost profitability

Final Submission Should Include

- SQL scripts and documentation.
- Entity Relationship Diagram (ERD) or schema design.
- Inventory KPI dashboard/report (mocked-up or real).
- A brief executive summary (1-2 pages) outlining your key insights and recommendations.

Dataset

Access the dataset using the following link:

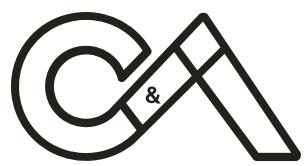
[Link](#)

Project Mentors

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Resources :

[Link](#)



Optimizing Revenue Leakage & Profitability in the Hospitality Sector

Introduction

In the competitive and dynamic hospitality industry, hotels and resorts often face unexplained revenue leakages, fluctuating profitability, and underutilized service offerings. These issues can stem from a variety of factors, such as inefficient pricing strategies, low-performing service segments (e.g., spa, room service, event hosting), poor upselling or cross-selling, misaligned customer targeting, or seasonal demand mismanagement. Despite having access to guest behavior data, booking patterns, and service usage metrics, many mid-sized hotel chains lack a systematic approach to extract actionable insights that directly improve their revenue streams and overall business model.

Project Objective

To develop a framework that helps hospitality businesses identify root causes of revenue leakage, propose data-backed product and pricing strategies, and justify them with business logic and forecasting models (like Week-on-Week (WoW) and critical business KPIs like Revenue, RevPAR, Occupancy %, and ADR).

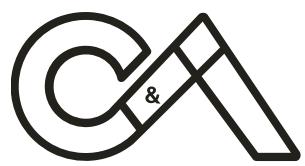
Project Components

1. Data Analysis Module

- Booking trends (weekday vs. weekend, room types)
- Seasonal occupancy vs. revenue correlation
- Ancillary service usage (spa, meals, transport, etc.)
- Customer segmentation based on spending behavior

2. Root Cause Analysis

- Identify why certain rooms or services underperform
- Analyze cancellation reasons and last-minute discount patterns
- Assess competitor pricing models and customer reviews



3. Consulting Recommendations

- New pricing and bundling strategies (e.g., couple packages, weekend getaways, corporate stays)
- Product optimization (shutting down/repurposing underperforming services)
- Operational tweaks (housekeeping, dynamic staffing)

4. Business Justification

- ROI and payback time for proposed changes
- Scenario analysis (best case, worst case, most likely)

5. Deliverables

- Dashboard with KPIs (Average Revenue Per Available Room - RevPAR, Occupancy %, Service Revenue Split, etc.)
- Recommendation report with visual justifications
- Optional: Interactive prototype on tools like Power BI/Tableau

Example Use Case

A hotel chain experiences declining profits during the off-season. You use data to show that event-hosting spaces are underbooked and suggest pivoting to co-working spaces during weekdays. You support this with ROI predictions and a breakdown of additional revenue expected.

Dataset

Access the dataset using the following link:

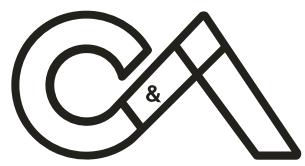
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Resources :

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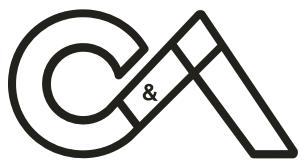
Ethical Supply Chains in the Electronics Industry

Introduction

In today's global economy, supply chains are no longer just logistical systems—they are moral battlegrounds. The electronics industry, in particular, faces growing scrutiny over labor exploitation, environmental harm, and a lack of transparency across vast, multi-tiered supplier networks. As companies scale across borders, they inherit the challenge—and responsibility—of ensuring their operations reflect not just efficiency, but fairness and sustainability. High-profile cases, such as Apple's manufacturing controversies in the early 2010s, have drawn attention to the darker side of globalization. Allegations of unsafe working conditions, excessive overtime, and weak environmental safeguards triggered global outrage. Apple responded with a set of bold reforms: stronger supplier codes of conduct, detailed annual transparency reports, renewable energy initiatives, and worker empowerment programs. While Apple's response sparked industry-wide conversations, many companies—especially small and mid-sized firms—still struggle to implement meaningful, transparent, and enforceable ESG (Environmental, Social, and Governance) practices. As supply chains grow increasingly complex, the need for scalable, tech-enabled, and stakeholder-driven solutions becomes urgent. This project challenges you to explore how global supply chains—especially in the electronics sector—can evolve to become engines of equity, resilience, and sustainability.

Project Objective

As part of a consulting team, your mission is to help multinational corporations—or even governments—fundamentally rethink and redesign their approach to ethical sourcing and sustainable supply chains. You are encouraged to explore the issue from diverse perspectives and define your own strategic path within this broader challenge. Your solution may take the form of innovative policies, technological tools, partnership models, or new frameworks—whatever you believe will create the most meaningful and scalable impact.



Project Components

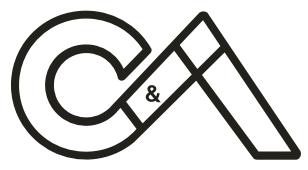
- **Ethical Labor Practices:** How can companies ensure safe, fair, and inclusive working environments across all supplier tiers, especially in countries with limited oversight?
- **Environmental Sustainability:** What strategies can reduce the ecological footprint of electronics production—from resource extraction to end-of-life disposal?
- **Supply Chain Transparency:** How might emerging technologies support greater visibility, traceability, and accountability?
- **Technology Integration:** How can digital tools (AI, blockchain, IoT, etc.) proactively detect violations or automate ESG reporting?
- **Stakeholder Accountability:** What models engage not just corporations, but also governments, consumers, NGOs, and workers in co-creating solutions?

Scope of Work

- **Diagnostic Assessment:** Evaluate current ethical and sustainability practices in global supply chains using comparative benchmarking (e.g., Apple, Nike, Unilever, Fairphone, Nestlé).
- **Policy Framework:** Recommend policy shifts or government interventions to strengthen ESG compliance and enforcement.
- **Innovation Playbook:** Identify and prototype technologies that enable real-time ESG monitoring, risk detection, or supplier verification.
- **Supplier Engagement Strategy:** Design programs to help suppliers build ESG capabilities through incentives, training, and tools.
- **Collaboration Model:** Propose industry-wide platforms for sharing best practices, harmonizing standards, and fostering public-private cooperation.

Deliverables

- A strategic plan or whitepaper outlining your approach and rationale.
- A prototype (e.g., dashboard, digital tool, app) for supply chain monitoring or ESG compliance.
- A supplier engagement toolkit with training materials, checklists, and incentive ideas.
- A set of policy or regulatory recommendations to support ethical sourcing.
- A comparative case study analysis and recommendations for scaling best practices.
- A crisis response framework for addressing ESG violations or public scrutiny.



Guiding Questions

- How can companies gain visibility into deeper supplier tiers where most violations occur?
- What are the trade-offs between voluntary codes of conduct and government mandates?
- How might small firms adopt ESG practices without large budgets or dedicated compliance teams?
- What types of incentives—regulatory, financial, reputational—are most effective for driving change?
- How can we make ESG transparency not just a responsibility, but a competitive edge?

Why This Matters

Behind every smartphone, laptop, or wearable lies a web of decisions that affect lives, livelihoods, and the planet. From cobalt mines in the Congo to assembly plants in Southeast Asia, the ethical burden of global consumption often falls on the most vulnerable. Yet these systems can be reimaged. This is not just an academic exercise—it's an opportunity to design the future of responsible globalization. Your ideas could influence real corporate policies, government strategies, or even tech solutions that shape how the world does business.

Call for Action

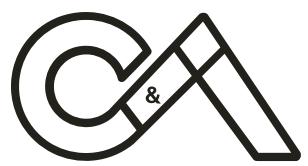
You have the chance to turn critical thinking into impact. Approach this challenge not just as students, but as future changemakers. Explore, question, create—and most importantly, imagine a world where global supply chains are as just and sustainable as they are efficient.

Project Mentors

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Resources :

[Link](#)



Addressing Domestic Violence in India

Introduction

Domestic violence is one of the gravest social challenges in India, impacting the safety, dignity, and future of millions of women across socioeconomic strata. As per the National Family Health Survey (NFHS-5), nearly 30% of Indian women aged 15–49 have experienced domestic violence at least once. However, this is only the tip of the iceberg—countless cases remain unreported due to cultural stigma, lack of legal awareness, or fear of retaliation.

This issue is not just about violence in the home—it is a systemic failure that perpetuates gender inequality, affects children, and hinders national development. The COVID-19 pandemic further highlighted vulnerabilities, with a significant spike in domestic abuse during lockdown periods.

Project Objective

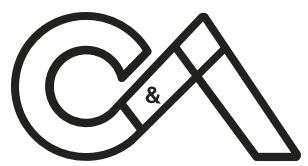
You are invited to act as Youth Policy Consultants to the Government of India. Your mission is to conduct comprehensive research, scrape and analyze real-world data, and design innovative, practical, and technology-driven solutions to combat domestic violence in India.

Your final deliverable will directly influence policymaking and public program development at state and national levels.

Goals of the Project

Participants are expected to:

- Understand the Landscape:** Analyze the scale, frequency, and geographic distribution of domestic violence cases across Indian states using reliable public datasets and media sources.
- Investigate Root Causes:** Study cultural, social, economic, and legal factors contributing to domestic violence.
- Identify Gaps in Support:** Assess the availability and effectiveness of current support systems like helplines, shelters, and legal aid.
- Design Solutions:** Propose actionable, data-backed strategies that prevent, address, and respond to domestic violence.
- Innovate with Technology:** Leverage apps, AI, IoT, or data analytics to create safe reporting channels, predictive models, or awareness platforms.

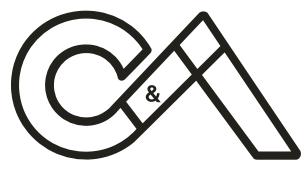


Scope of Work

- **Data Collection & Analysis:**
 - Scrape data from credible sources (NFHS, NCRB, NHRC, news archives, NGOs).
 - Analyze data trends: age groups, regions, marital status, recurrence patterns.
 - Build visual dashboards or heat maps.
- **Stakeholder Mapping:**
 - Identify roles of police, judiciary, NGOs, healthcare workers, and community leaders.
 - Analyze coordination challenges and propose collaborative frameworks.
- **Campaign Design:**
 - Develop community-led awareness programs.
 - Craft communication strategies for urban and rural settings, focusing on youth and men.
- **Policy Recommendations:**
 - Identify loopholes in current laws (e.g., Section 498A IPC, PWDVA Act).
 - Suggest amendments or new bills focusing on rehabilitation, victim protection, and offender reformation.
- **Technology Integration:**
 - Explore discreet mobile apps, AI-driven alert systems, or chatbot-based support.
 - Suggest use of blockchain for secure victim documentation or case tracking.
- **Sustainability & Funding:**
 - Design cost-effective implementation strategies.
 - Propose public-private partnership models or CSR-based funding mechanisms.

Deliverables

1. **Comprehensive Research Report (min 15+ pages)**
 - Includes data analysis, solution architecture, and policy recommendations.
2. **Executive Presentation (10+ slides)**
 - Summary for policymakers, focusing on impact and feasibility.
3. **Prototype or Demo (Optional but Encouraged)**
 - App, dashboard, or awareness campaign mockup.
4. **Implementation Roadmap**
 - Timeline, budget estimation, stakeholder responsibility matrix, success metrics.



Guiding Questions

- How can we build discreet yet accessible channels for victims to report abuse?
- What role can AI and data analytics play in identifying high-risk households or regions?
- How do we challenge and change harmful societal norms?
- What incentives can encourage community-based reporting and bystander intervention?
- How can we make the judicial and police systems more empathetic and survivor-centric?

Severity of the Issue

Domestic violence is not just a personal crisis—it is a human rights violation and a public health emergency. It leaves deep psychological and economic scars, perpetuates gender-based violence across generations, and undermines India's global human development goals.

Call to Action

This is your opportunity to become a changemaker. Use your skills, passion, and academic training to shape safer futures for millions of Indian women and girls. Your ideas today could lead to policy action tomorrow. Together, let's create a country where every home is a place of safety—not fear.

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- Subhashree Kedia : +91 93480 72274

Resources :

[Link](#)