

**CIS 467**

**Data Management, Warehousing, and Visualization**

**Spring 2025**

# **Customer Revenue Analysis**

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Table of Contents

[Customer Revenue Analysis 1](#_Toc205748489)

[Overview 3](#_Toc205748490)

[Data Warehouse: Customer Revenue 4](#_Toc205748491)

[Customer Revenue Analytical View 5](#_Toc205748492)

[Query 1 - Identifying Potential VIP Customers 8](#_Toc205748493)

[Query 2 - Average Spending Per Rental by Country 9](#_Toc205748494)

[Query 3 - Monthly Revenue Trend 10](#_Toc205748495)

[Query 4 - Customers Who Stopped Renting 11](#_Toc205748496)

[Query 5 - Top Movie Genre by Country (Revenue) 12](#_Toc205748497)

[Query 6 - Most Profitable Movie Category Overall 13](#_Toc205748498)

[Query 7 - Customer Lifetime Value (CLV) Analysis 14](#_Toc205748499)

[Query 8 - Peak Rental Days 15](#_Toc205748500)

[Tableau Visualizations & Dashboard 16](#_Toc205748501)

[Graph 1 - Geographic Revenue & Late Fees 16](#_Toc205748502)

[Graph 2 - Monthly Payment Trends 17](#_Toc205748503)

[Graph 3 - Revenue by Movie Category (Box Plot) 18](#_Toc205748504)

[Graph 4 - Genre Market Share (Bubble Chart) 19](#_Toc205748505)

[Graph 5 - Year-over-Year Genre Performance 20](#_Toc205748506)

[Dashboard - Executive Overview 21](#_Toc205748507)

# Overview

This project analyzes customer behavior and revenue trends for a DVD rental company. The goal is to build a Customer Revenue Data Warehouse that consolidates data from multiple operational tables into a single, summarized view.

The resulting dataset (customer\_revenue\_summary) enables management to:

* Identify **top customers** for loyalty and retention programs
* Understand **regional spending patterns** to tailor marketing
* Analyze **genre-level performance** to guide inventory acquisition
* Detect **inactive customers** for re-engagement campaigns
* Recognize **seasonal and peak trends** for operational planning

This data-driven approach supports informed decision-making that directly impacts revenue, customer satisfaction, and long-term growth.

# Data Warehouse: Customer Revenue

The below database was created using the sakila-schema.sql and sakila-data.sql scripts, which define the structure and populate it with sample transactional data related to company operations:

A computer screen shot of a diagram

AI-generated content may be incorrect.

# Customer Revenue Analytical View

The Customer Revenue Analytical View is designed to help the DVD rental company gain deeper insights into its customers’ rental behaviors and revenue contributions. By aggregating transactional data from multiple operational tables in the Sakila database, this view provides a consolidated summary of customer preferences, revenue patterns, and overall rental trends. These insights enable management to make informed, data-driven decisions on marketing strategies, customer retention, and pricing optimization.

**SQL:**

-- DATA WAREHOUSE

USE sakila;

DROP VIEW IF EXISTS customer\_revenue\_summary;

CREATE VIEW customer\_revenue\_summary AS

SELECT

c.customer\_id AS Customer\_ID,

CONCAT(c.first\_name, ' ', c.last\_name) AS Customer\_Name,

COUNT(r.rental\_id) AS Total\_Rentals,

ROUND(SUM(p.amount), 2) AS Total\_Revenue,

ROUND(SUM(p.amount) / COUNT(r.rental\_id), 2) AS Avg\_Spending\_Per\_Rental,

COUNT(DISTINCT fc.category\_id) AS Total\_Categories\_Rented,

(SELECT name

FROM category

JOIN film\_category fc ON category.category\_id = fc.category\_id

JOIN inventory i ON fc.film\_id = i.film\_id

JOIN rental r2 ON i.inventory\_id = r2.inventory\_id

WHERE r2.customer\_id = c.customer\_id

GROUP BY category.name

ORDER BY COUNT(\*) DESC

LIMIT 1) AS Most\_Frequent\_Category,

ROUND(COALESCE(SUM(CASE

WHEN DATEDIFF(r.return\_date, r.rental\_date) > f.rental\_duration

THEN (DATEDIFF(r.return\_date, r.rental\_date) - f.rental\_duration) \* 0.50

ELSE 0 END), 0), 2) AS Total\_Late\_Fees,

(SELECT MIN(rental\_date) FROM rental WHERE customer\_id = c.customer\_id) AS First\_Rental\_Date,

(SELECT MAX(rental\_date) FROM rental WHERE customer\_id = c.customer\_id) AS Last\_Rental\_Date,

COUNT(p.payment\_id) AS Total\_Payments,

ci.city AS Customer\_City,

co.country AS Customer\_Country

FROM customer c

JOIN address a ON c.address\_id = a.address\_id

JOIN city ci ON a.city\_id = ci.city\_id

JOIN country co ON ci.country\_id = co.country\_id

JOIN rental r ON c.customer\_id = r.customer\_id

JOIN inventory i ON r.inventory\_id = i.inventory\_id

JOIN film f ON i.film\_id = f.film\_id

LEFT JOIN payment p ON r.rental\_id = p.rental\_id

LEFT JOIN film\_category fc ON i.film\_id = fc.film\_id

GROUP BY c.customer\_id, Customer\_Name, ci.city, co.country;

SELECT \* FROM customer\_revenue\_summary LIMIT 25;

**Output:**

A screenshot of a computer

AI-generated content may be incorrect.

# Query 1 - Identifying Potential VIP Customers

**Business Question:** Which customers generate high revenue and rent frequently, making them ideal for premium loyalty programs?

**Purpose:** High-spending, frequent renters are crucial for sustained business growth. Identifying these customers enables tailored engagement—such as exclusive offers, early access to releases, and personalized recommendations—maximizing customer lifetime value.

**SQL:**

SELECT Customer\_ID, Customer\_Name, Total\_Rentals, Total\_Revenue,

ROUND(Total\_Revenue / NULLIF(Total\_Rentals, 0), 2) AS Revenue\_Per\_Rental

FROM customer\_revenue\_summary

WHERE Total\_Rentals > 30 AND Total\_Revenue > 150

ORDER BY Total\_Revenue DESC, Total\_Rentals DESC

LIMIT 25;

**Output:**

A screenshot of a table

AI-generated content may be incorrect.

# Query 2 - Average Spending Per Rental by Country

**Business Question:** How much do customers from different countries spend per rental on average?

**Purpose:** Understanding regional spending habits allows the company to refine its pricing strategy and create country-specific promotions. High-spending regions may present opportunities for premium services, while low-spending markets may benefit from bundled offers or discounts.

**SQL:**

SELECT Customer\_Country,

ROUND(AVG(Avg\_Spending\_Per\_Rental), 2) AS Avg\_Spending

FROM customer\_revenue\_summary

GROUP BY Customer\_Country

ORDER BY Avg\_Spending DESC

LIMIT 25;

**Output:**

**A screenshot of a table

AI-generated content may be incorrect.**

# Query 3 - Monthly Revenue Trend

**Business Question:** How does revenue fluctuate over time?

**Purpose:** Monitoring revenue trends helps identify seasonal demand patterns, enabling the company to optimize inventory levels, schedule marketing campaigns during slower months, and accurately forecast revenue.

**SQL:**

SELECT DATE\_FORMAT(First\_Rental\_Date, '%Y-%m') AS Rental\_Month,

ROUND(SUM(Total\_Revenue), 2) AS Monthly\_Revenue

FROM customer\_revenue\_summary

GROUP BY Rental\_Month

ORDER BY Rental\_Month;

**Output:**

A screenshot of a phone

AI-generated content may be incorrect.

# Query 4 - Customers Who Stopped Renting

**Business Question:** Which customers have not rented in the last 6 months?

**Purpose:** Detecting inactive customers allows for targeted re-engagement campaigns—such as promotional emails, loyalty rewards, or personalized recommendations—aimed at winning them back before they permanently churn.

**SQL:**

SELECT Customer\_ID, Customer\_Name, Last\_Rental\_Date

FROM customer\_revenue\_summary

WHERE Last\_Rental\_Date < DATE\_SUB(CURDATE(), INTERVAL 6 MONTH)

LIMIT 25;

**Output:**

A table with numbers and numbers

AI-generated content may be incorrect.

# Query 5 - Top Movie Genre by Country (Revenue)

**Business Question:** Which movie genre generates the most revenue in each country?

**Purpose:** Understanding genre preferences by region allows the company to optimize inventory, tailor marketing messages, and acquire content that aligns with local tastes.

**SQL:**

SELECT co.country AS Customer\_Country,

fc.category\_id AS Genre\_ID,

c.name AS Genre\_Name,

ROUND(SUM(p.amount), 2) AS Total\_Revenue

FROM rental r

JOIN inventory i ON r.inventory\_id = i.inventory\_id

JOIN film\_category fc ON i.film\_id = fc.film\_id

JOIN category c ON fc.category\_id = c.category\_id

JOIN payment p ON r.rental\_id = p.rental\_id

JOIN customer cu ON r.customer\_id = cu.customer\_id

JOIN address a ON cu.address\_id = a.address\_id

JOIN city ci ON a.city\_id = ci.city\_id

JOIN country co ON ci.country\_id = co.country\_id

GROUP BY Customer\_Country, Genre\_ID, Genre\_Name

ORDER BY Customer\_Country, Total\_Revenue DESC

LIMIT 25;

**Output:**

A table with numbers and words

AI-generated content may be incorrect.

# Query 6 - Most Profitable Movie Category Overall

**Business Question:** Which movie category generates the most revenue overall?

**Purpose:** Identifying top-performing genres guides inventory planning, marketing spend allocation, and potential expansion of popular categories to drive higher revenue.

**SQL:**

SELECT Most\_Frequent\_Category AS Movie\_Category,

ROUND(SUM(Total\_Revenue), 2) AS Category\_Revenue

FROM customer\_revenue\_summary

GROUP BY Most\_Frequent\_Category

ORDER BY Category\_Revenue DESC

LIMIT 25;

**Output:**

A screenshot of a table

AI-generated content may be incorrect.

# Query 7 - Customer Lifetime Value (CLV) Analysis

**Business Question:** Which customers contribute the most revenue over their lifetime?

**Purpose:** High-CLV customers are prime targets for retention programs. By understanding their behavior, the company can create premium offers and reward programs that maintain their loyalty.

**SQL:**

SELECT Customer\_ID, Customer\_Name, Total\_Revenue,

DATEDIFF(Last\_Rental\_Date, First\_Rental\_Date) AS Rental\_Duration\_Days,

ROUND(Total\_Revenue / NULLIF(DATEDIFF(Last\_Rental\_Date, First\_Rental\_Date), 0), 2) AS Revenue\_Per\_Day

FROM customer\_revenue\_summary

ORDER BY Total\_Revenue DESC

LIMIT 25;

**Output:**

A table with numbers and a number of people

AI-generated content may be incorrect.

# Query 8 - Peak Rental Days

**Business Question:** On which days of the week do rentals peak?

**Purpose:** Identifying high-traffic rental days allows for better staffing, marketing campaigns, and promotions that align with customer behavior patterns.

**SQL:**

SELECT DAYNAME(First\_Rental\_Date) AS Rental\_Day,

COUNT(Customer\_ID) AS Total\_Rentals,

ROUND(SUM(Total\_Revenue), 2) AS Total\_Revenue

FROM customer\_revenue\_summary

GROUP BY Rental\_Day

ORDER BY Total\_Rentals DESC;

**Output:**

A screenshot of a table

AI-generated content may be incorrect.

# Tableau Visualizations & Dashboard

## Graph 1 - Geographic Revenue & Late Fees

A map of the world with different colored circles

AI-generated content may be incorrect.

A bubble map shows global revenue distribution (bubble size) and late fee impact (color intensity). Management can pinpoint profitable markets like the US and India while addressing late fee issues in other regions.

## Graph 2 - Monthly Payment Trends

A graph of a number of different colored bars

AI-generated content may be incorrect.

A time-series line chart displaying revenue patterns across months. This helps identify seasonal peaks and troughs for better inventory and marketing planning.

## Graph 3 - Revenue by Movie Category (Box Plot)

A graph of a bar chart

AI-generated content may be incorrect.

Visualizes variability in revenue per genre, highlighting high-potential categories (e.g., Sci-Fi, Sports) for investment.

## Graph 4 - Genre Market Share (Bubble Chart)

A diagram of different colored circles

AI-generated content may be incorrect.

Shows each genre’s revenue share, enabling informed decisions on marketing budgets and inventory allocation.

## Graph 5 - Year-over-Year Genre Performance

A graph of blue and orange bars

AI-generated content may be incorrect.

A bar chart comparing genre performance over two years to reveal growth or decline trends.

# Dashboard - Executive Overview

A screenshot of a graph

AI-generated content may be incorrect.

A unified, interactive dashboard combining all five visualizations with a country filter, giving management instant access to market-specific insights and revenue drivers.