

# **MOVIE RENTAL ANALYSIS REPORT DOCUMENTATION**

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## **1. INTRODUCTION**

The **Movie Rental Analysis Project** is a comprehensive business intelligence initiative designed to analyse and visualize the operational data of a DVD rental business using the **Sakila Database**. This database, originally developed by MySQL, simulates the structure of a real-world DVD rental store — capturing intricate details about customers, films, rentals, payments, staff, and store locations. By leveraging this dataset, the project aims to uncover valuable insights into business performance and customer behaviour through advanced analytics and data visualization techniques in **Power BI**.

In an increasingly data-driven marketplace, understanding operational efficiency, customer preferences, and sales trends has become crucial for sustained business success. Traditional reporting methods often fail to reveal patterns hidden within large datasets. The use of Power BI in this project bridges that gap by transforming raw, unstructured data into meaningful, interactive visual reports. This allows decision-makers to gain a deeper understanding of how different aspects of the rental business interact — from customer engagement and film popularity to staff productivity and store profitability.

The Sakila database provides an ideal foundation for this analytical study due to its well-structured, relational design and realistic data composition. Each table in the database represents a key business entity — customers, films, inventory, payments, and rentals — interconnected through logical relationships. This relational model enables multidimensional analysis across various performance areas such as revenue, customer retention, and product demand. By analysing these entities collectively, the project aims to provide a holistic view of the business ecosystem.

Ultimately, the **objective of this project** is to design a visually compelling and analytically robust **Power BI dashboard** that consolidates critical performance metrics and key insights into one cohesive platform. The dashboard empowers business stakeholders to make informed, evidence-based decisions to improve efficiency, enhance customer satisfaction, and maximize revenue. Through this analysis, the project showcases how modern data analytics tools can revolutionize traditional retail operations — paving the way for data-informed strategic planning, targeted marketing, and operational excellence in the DVD rental industry.

## **2. Objective Of The Report**

The primary objective of this report is to transform raw transactional data from the Sakila DVD Rental Store Database into meaningful, actionable business intelligence using Power BI. The project seeks to bridge the gap between data collection and data-driven decision-making by enabling stakeholders to visualize and interpret business patterns effectively. Through this analysis, the report aims to provide a comprehensive understanding of key operational areas—such as customer behaviour, sales performance, film inventory, and staff productivity—ultimately driving strategic and operational improvements across the organization.

A major goal of the report is to develop a fully interactive Power BI dashboard that captures and displays key performance indicators (KPIs) in a visually engaging and user-friendly format. This dashboard serves as a single source of truth for managers, analysts, and executives to monitor business health and identify opportunities for growth. It will allow users to perform dynamic analyses, such as comparing revenues across stores, identifying high-performing films, evaluating staff efficiency, and understanding customer engagement levels across geographic locations.

The report also emphasizes the use of data modelling, transformation, and visualization best practices within Power BI to ensure accuracy, scalability, and usability. Through structured data relationships, calculated DAX measures, and optimized report design, the dashboard aims to reflect real-time insights with minimal manual intervention. Additionally, the project underscores the importance of clean data integration and quality control during the data extraction and transformation stages, which are essential for maintaining the credibility and reliability of the final analytical output.

Ultimately, this report aspires to highlight the transformative role of business intelligence tools in modern data analysis. By analysing rental patterns, customer segments, and revenue drivers, the study not only enhances operational transparency but also provides actionable recommendations for optimizing film inventory, improving customer satisfaction, and enhancing staff performance. In essence, the objective is not merely to visualize data but to derive strategic insights that empower decision-makers to align their business objectives with measurable, data-backed outcomes.

### **3. Dataset Overview**

The dataset used in the Movie Rental Analysis Power BI Report is derived from the Sakila DVD Rental Store Database, a well-established and realistic dataset that simulates the operations of a DVD rental business. The Sakila database mirrors real-world rental scenarios, capturing the intricate relationships among customers, films, inventory, rentals, payments, and staff. Its well-structured relational design makes it an ideal foundation for building analytical models and Power BI dashboards that reflect true business performance across multiple functional areas such as sales, customer behaviour, staff performance, and store operations.

The Sakila database comprises multiple interconnected tables that together form a complete and normalized data model. Each table captures specific dimensions of the business process — including customer profiles, movie attributes, rental transactions, and financial payments — all of which are tied together through primary and foreign key relationships. This relational structure supports cross-functional analysis and ensures data integrity within Power BI, allowing for seamless integration, filtering, and drill-down across different levels of business detail.

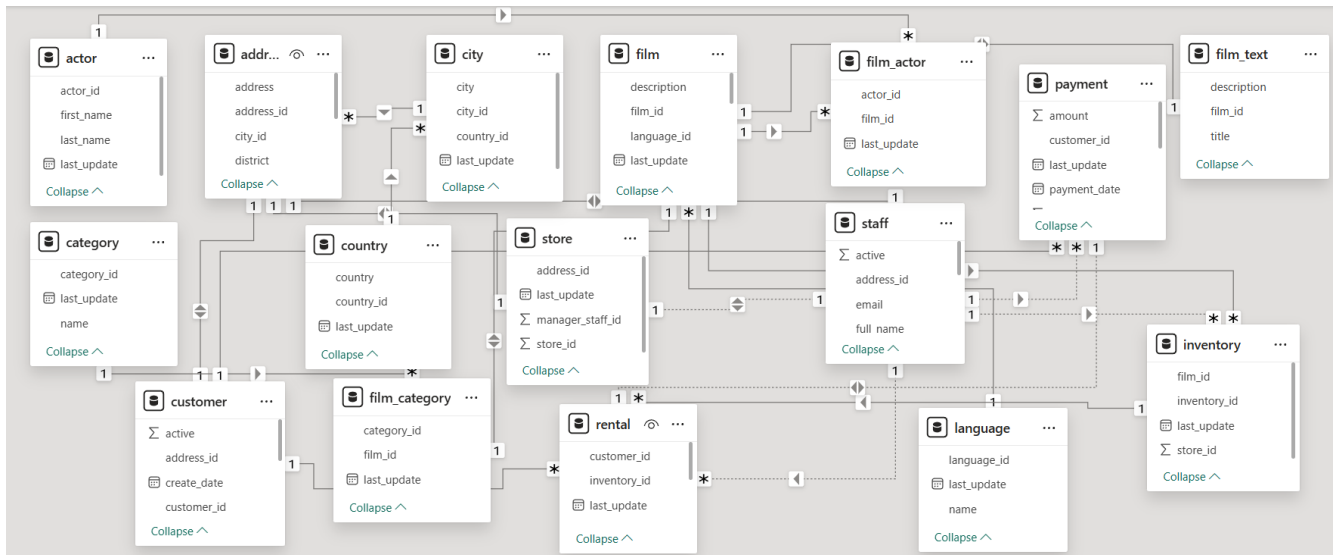
Below is an overview of the main tables and their significance:

- Customer Table – Stores customer information, including *Customer ID*, *First Name*, *Last Name*, *Email*, *Address ID*, and *Active Status*. This table is crucial for analysing customer demographics, rental frequency, and engagement levels, as well as for segmenting customers by activity or location.
- Film Table – Contains film-specific attributes such as *Film ID*, *Title*, *Description*, *Release Year*, *Language ID*, *Rental Duration*, *Rental Rate*, *Length*, and *Rating*. This table supports analyses related to film performance, rental popularity, and content management.
- Rental Table – Tracks every rental transaction, including *Rental ID*, *Rental Date*, *Inventory ID*, *Customer ID*, *Return Date*, and *Staff ID*. It serves as the backbone for analysing rental frequency, customer activity, and film demand over time.
- Payment Table – Records all payment transactions, including *Payment ID*, *Customer ID*, *Staff ID*, *Rental ID*, *Amount*, and *Payment Date*. This table forms the basis for revenue analysis, cash flow tracking, and profitability assessment.
- Inventory Table – Represents available film copies in stores, with attributes like *Inventory ID*, *Film ID*, and *Store ID*. It supports stock management analysis and helps determine film availability and distribution efficiency.
- Staff Table – Contains employee-related details, including *Staff ID*, *First Name*, *Last Name*, *Email*, *Store ID*, and *Active Status*. This data enables performance evaluation, sales contribution analysis, and staff productivity tracking.

- Store Table – Defines store-level information such as *Store ID*, *Manager Staff ID*, and *Address ID*, allowing for store-wise revenue comparisons and operational benchmarking.
- Category Table – Lists film genres (e.g., Action, Comedy, Drama) and is used in conjunction with the *Film Category* table to group films into distinct analytical categories.
- Film Category Table – Connects films to their respective categories through *Film ID* and *Category ID*, facilitating category-based performance analysis and content segmentation.
- Film Actor Table – Establishes many-to-many relationships between films and actors, useful for understanding actor involvement and film cast diversity.
- Language Table – Provides the language information for films via *Language ID* and *Name*, allowing analysis of film preferences by language and market diversity.
- Address, City, and Country Tables – Store geographic and location-based information for customers, staff, and stores, enabling geographic segmentation and location-based trend analysis.

In Power BI, these tables are integrated through relationship modelling where identifiers such as *Customer ID*, *Film ID*, *Store ID*, and *Rental ID* act as relational keys. This model supports unified visualizations that connect customer activity, rental history, and financial performance. Prior to dashboard creation, essential data transformations—including column renaming, date formatting, relationship establishment, and creation of calculated measures such as *Total Revenue*, *Average Rental Duration*, *Rental Frequency*, and *Active Customers*—were implemented to ensure analytical accuracy and consistency.

Overall, the Sakila Database provides a robust analytical foundation for understanding key aspects of the movie rental business. Its diversity and relational depth enable the evaluation of critical business questions such as which films generate the most revenue, which customers are most valuable, how staff performance influences rental outcomes, and how store location affects profitability. This dataset serves as the cornerstone of the MECE-based Power BI reporting structure, ensuring that every analytical dimension—customer, film, staff, and store—is mutually exclusive and collectively exhaustive, providing complete and non-overlapping insights into business performance.



## Sample Dataset Schema

STORE TABLE			
Column Name	Data Type	Description	Key
store_id	SMALLINT	Unique identifier for each store	PK
manager_staff_id	TINYINT	Staff ID of the store manager	FK → staff.staff_id
address_id	SMALLINT	Store's address ID	FK → address.address_id
last_update	TIMESTAMP	Timestamp of last modification	

CITY TABLE			
Column Name	Data Type	Description	Key
city_id	SMALLINT	Unique ID for each city	PK
city	VARCHAR(50)	City name	
country_id	SMALLINT	Associated country	FK → country.country_id
last_update	TIMESTAMP	Last update time	

STAFF TABLE			
Column Name	Data Type	Description	Key
staff_id	TINYINT	Unique ID for each staff member	PK
first_name	VARCHAR(45)	Staff member's first name	
last_name	VARCHAR(45)	Staff member's last name	
address_id	SMALLINT	Address reference	FK → address.address_id
email	VARCHAR(50)	Staff email address	
store_id	TINYINT	Store ID where staff works	FK → store.store_id
active	BOOLEAN	Whether staff member is active	
username	VARCHAR(16)	Login username	
password	VARCHAR(40)	Login password (for internal use)	
last_update	TIMESTAMP	Timestamp of last modification	
picture	BLOB	Staff profile image	

FILM TABLE			
Column Name	Data Type	Description	Key
film_id	SMALLINT	Unique film ID	PK
title	VARCHAR(255)	Film title	
description	TEXT	Film summary	
release_year	YEAR	Release year	
language_id	TINYINT	Language of the film	FK → language.language_id
original_language_id	TINYINT	Original language (if different)	FK → language.language_id
rental_duration	TINYINT	Number of days allowed for rental	
rental_rate	DECIMAL(4,2)	Rental price per period	
length	SMALLINT	Length of the film (minutes)	
replacement_cost	DECIMAL(5,2)	Cost to replace lost/damaged film	
rating	ENUM('G','PG','PG-13','R','NC-17')	Film rating	
special_features	SET('Trailers','Commentaries','Deleted Scenes','Behind the Scenes')	Special features included	
last_update	TIMESTAMP	Timestamp of last modification	

CUSTOMER TABLE			
Column Name	Data Type	Description	Key
customer_id	SMALLINT	Unique ID for each customer	PK
store_id	TINYINT	Store assigned to the customer	FK → store.store_id
first_name	VARCHAR(45)	Customer's first name	
last_name	VARCHAR(45)	Customer's last name	
email	VARCHAR(50)	Customer email address	
address_id	SMALLINT	Customer's address	FK → address.address_id
active	BOOLEAN	Active customer flag	
create_date	DATETIME	Account creation date	
last_update	TIMESTAMP	Timestamp of last update	

FILM_TEXT TABLE			
Column Name	Data Type	Description	Key
film_id	SMALLINT	Film reference ID	PK / FK → film.film_id
title	VARCHAR(255)	Film title	
description	TEXT	Film description	

ADDRESS TABLE			
Column Name	Data Type	Description	Key
address_id	SMALLINT	Unique address ID	PK
address	VARCHAR(50)	Address line 1	
address2	VARCHAR(50)	Address line 2 (optional)	
district	VARCHAR(20)	District or region	
city_id	SMALLINT	Associated city	FK → city.city_id
postal_code	VARCHAR(10)	Postal or ZIP code	
phone	VARCHAR(20)	Contact number	
last_update	TIMESTAMP	Timestamp of last update	

FILM_ACTOR TABLE			
Column Name	Data Type	Description	Key
actor_id	SMALLINT	Linked actor	PK / FK → actor.actor_id
film_id	SMALLINT	Linked film	PK / FK → film.film_id
last_update	TIMESTAMP	Timestamp of last update	

ACTOR TABLE			
Column Name	Data Type	Description	Key
actor_id	SMALLINT	Unique actor ID	PK
first_name	VARCHAR(45)	Actor first name	
last_name	VARCHAR(45)	Actor last name	
last_update	TIMESTAMP	Timestamp of last update	

FILM_CATEGORY TABLE			
Column Name	Data Type	Description	Key
film_id	SMALLINT	Film reference	PK / FK → film.film_id
category_id	TINYINT	Category reference	PK / FK → category.category_id
last_update	TIMESTAMP	Timestamp of last update	

CATEGORY TABLE			
Column Name	Data Type	Description	Key
category_id	TINYINT	Unique category ID	PK
name	VARCHAR(25)	Category name	
last_update	TIMESTAMP	Timestamp of last update	

INVENTORY TABLE			
Column Name	Data Type	Description	Key
inventory_id	MEDIUMINT	Unique copy identifier	PK
film_id	SMALLINT	Linked film	FK → film.film_id
store_id	TINYINT	Store that owns the copy	FK → store.store_id
last_update	TIMESTAMP	Timestamp of last update	

PAYMENT TABLE			
Column Name	Data Type	Description	Key
payment_id	SMALLINT	Unique payment ID	PK
customer_id	SMALLINT	Linked customer	FK → customer.customer_id
staff_id	TINYINT	Staff member processing payment	FK → staff.staff_id
rental_id	INT	Related rental transaction	FK → rental.rental_id
amount	DECIMAL(5,2)	Payment amount	
payment_date	DATETIME	Date and time of payment	
last_update	TIMESTAMP	Timestamp of last update	

RENTAL TABLE			
Column Name	Data Type	Description	Key
rental_id	INT	Unique rental ID	PK
rental_date	DATETIME	Date and time of rental	
inventory_id	MEDIUMINT	Copy rented	FK → inventory.inventory_id
customer_id	SMALLINT	Customer renting	FK → customer.customer_id
return_date	DATETIME	Date and time of return	
staff_id	TINYINT	Staff member handling rental	FK → staff.staff_id
last_update	TIMESTAMP	Timestamp of last modification	

LANGUAGE TABLE			
Column Name	Data Type	Description	Key
language_id	TINYINT	Unique language ID	PK
name	CHAR(20)	Language name	
last_update	TIMESTAMP	Timestamp of last update	

COUNTRY TABLE			
Column Name	Data Type	Description	Key
country_id	SMALLINT	Unique country ID	PK
country	VARCHAR(50)	Country name	
last_update	TIMESTAMP	Timestamp of last modification	



## **4. Data Extraction**

The data used for the Movie Rental Analysis Power BI Report was extracted from the Sakila MySQL Database, a structured and relational data source representing a DVD rental store's operation. The extraction process involved connecting Power BI directly to the MySQL server to retrieve, transform, and prepare the required tables for analysis. This process ensured that the data was clean, consistent, and optimized for creating interactive dashboards that deliver accurate business insights. The data extraction phase served as the foundation for all subsequent modelling, visualization, and reporting steps.

The following steps were followed to ensure accurate and efficient data extraction:

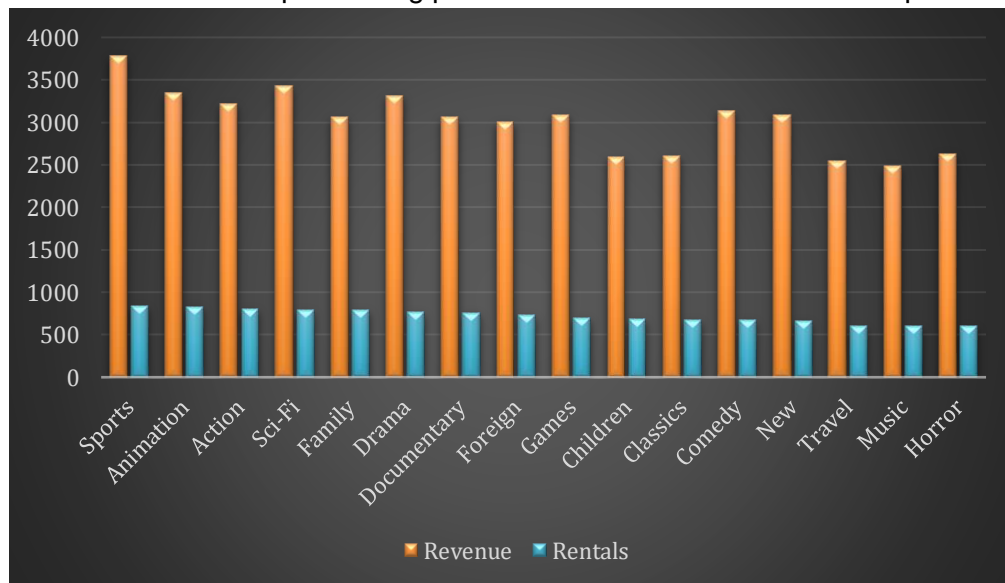
1. **Database Connection** – Power BI was connected to the Sakila Database using the built-in MySQL database connector. Proper authentication credentials (server name, port, username, and password) were provided to establish a secure link between Power BI and the MySQL server. Once connected, the database schema was previewed to select the relevant tables required for analysis, such as *Customer*, *Film*, *Rental*, *Payment*, *Inventory*, *Staff*, *Store*, *Category*, and *Language*.
2. **Table Selection and Import** – After establishing the connection, only the essential tables were imported to maintain performance efficiency and ensure the focus remained on key business entities. Tables containing transactional data (*Rental*, *Payment*, *Inventory*) and dimensional data (*Customer*, *Film*, *Store*, *Staff*, *Category*) were chosen to build a star-schema model in Power BI.
3. **Data Transformation and Cleaning** – Using Power Query Editor, each table underwent data transformation processes, including column renaming, datatype correction, null value handling, and removal of redundant fields. Unnecessary columns (such as system-generated timestamps or text fields with duplicate information) were excluded to streamline the model. Additional transformations such as splitting concatenated fields (e.g., customer full names), standardizing date formats, and creating calculated columns were also performed.
4. **Data Modelling and Relationship Building** – Once data was cleaned, relationships were established between tables using primary and foreign keys (e.g., *Customer ID*, *Film ID*, *Store ID*, and *Rental ID*). This step ensured referential integrity and enabled cross-table analysis. The final data model was structured in a star schema, with fact tables (*Rental* and *Payment*) at the centre, surrounded by dimension tables (*Customer*, *Film*, *Staff*, *Store*, *Category*, *Language*).

5. Creation of Calculated Columns and Measures – To support analytical visualization, DAX (Data Analysis Expressions) formulas were created for key performance indicators such as *Total Revenue*, *Total Rentals*, *Average Rental Duration*, *Active Customers*, and *Revenue per Store*. These calculated measures enhanced the interactivity and depth of the Power BI dashboard.
6. Data Validation and Consistency Checks – After data modelling, validation was performed to ensure that numerical totals, counts, and relationships matched those from the original database queries. This step confirmed data accuracy and integrity before visualization.

Through these steps, the extracted data was transformed into a ready-to-use analytical model within Power BI. This structured approach ensured that all data sources were properly integrated and standardized, laying a strong foundation for developing a dynamic and accurate Power BI dashboard. The use of efficient transformation techniques and DAX-based calculations also ensured real-time responsiveness and performance optimization during interactive exploration.

### **EDA Questions And Their Insights:**

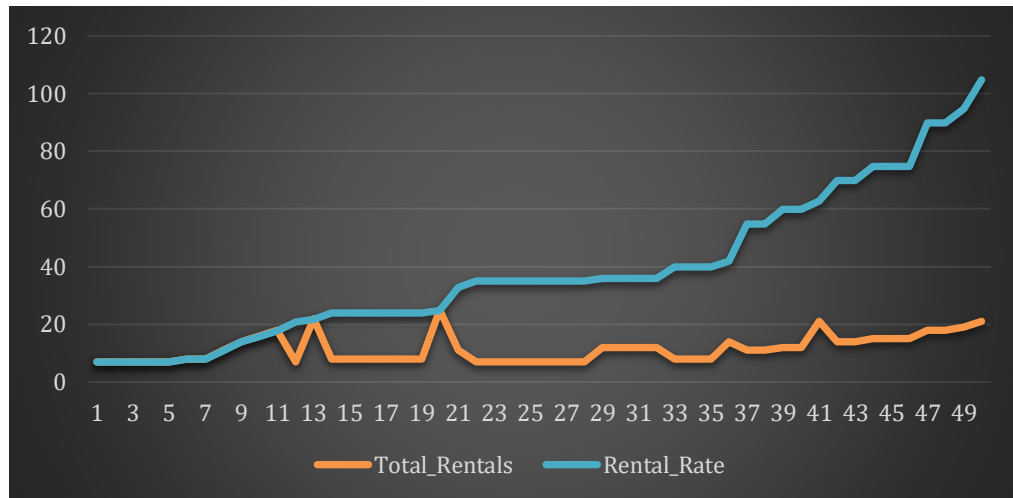
1. What are the purchasing patterns of new customers versus repeat customers?



### **Insight Drawn:**

Repeat customers generate significantly higher revenue and rental activity across all categories, with Sports, Animation, and Action films driving the most engagement. This suggests that investing in promotions or loyalty programs targeting repeat customers, particularly for high-demand genres, can maximize revenue. Additionally, stocking more films in these popular categories and recommending them to repeat customers could further boost rentals and overall profitability.

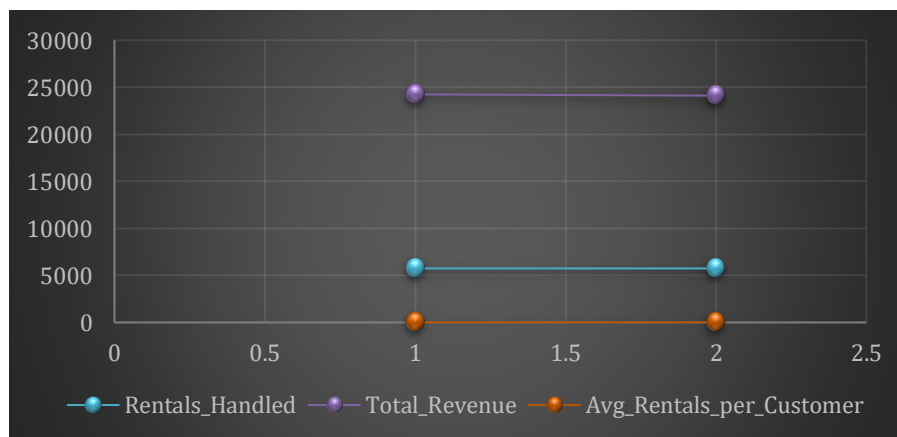
2. Which films have the highest rental rates and are most in demand?



**Insight Drawn:**

Films with higher rental rates tend to also have strong demand, particularly titles like *MOVIE SHAKESPEARE*, *SEATTLE EXPECTATIONS*, and *WARDROBE PHANTOM*, which balance high rental prices with consistent rentals per copy. This indicates that customers are willing to pay premium rates for popular titles. To maximize revenue, the business should focus on maintaining sufficient copies of high-demand, high-rate films and consider targeted promotions for these premium titles to attract repeat rentals.

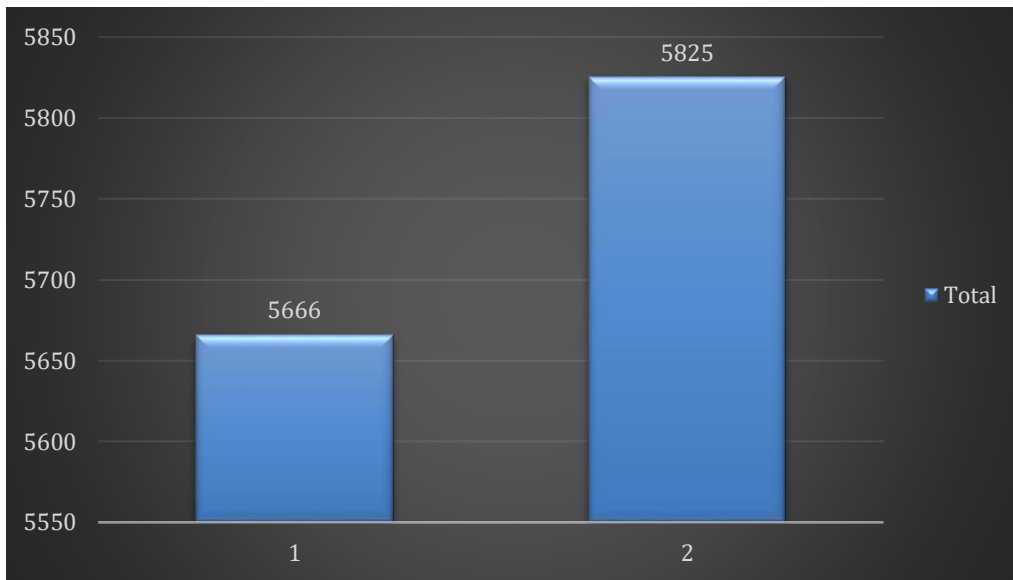
3. Are there correlations between staff performance and customer satisfaction?



**Insight Drawn:**

Staff performance, measured by rentals handled and revenue generated, is closely aligned with customer engagement, as indicated by similar average rentals per customer. Both Jon Stephens and Mike Hillyer demonstrate high efficiency, suggesting that well-performing staff contribute directly to higher customer satisfaction and repeat rentals. Focusing on staff training and best-practice sharing could help maintain consistent service quality across the team.

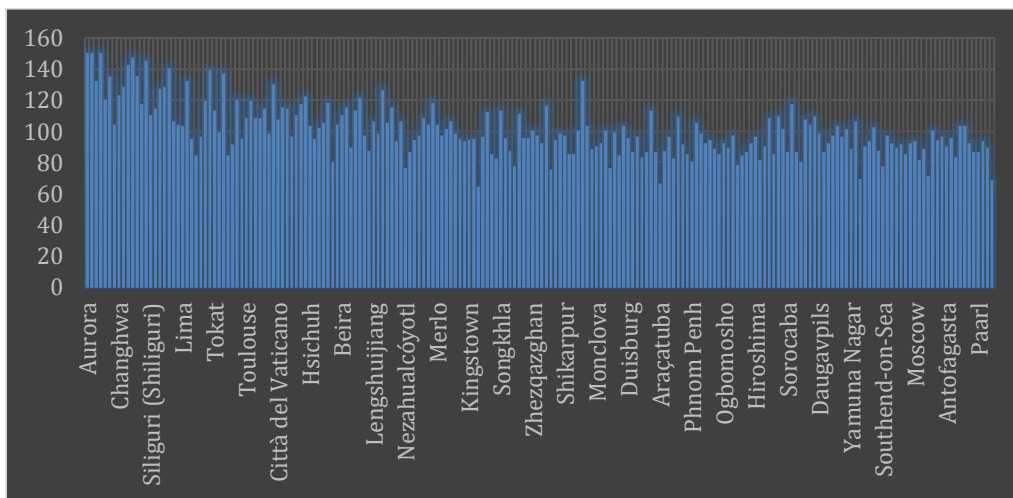
4. Are there seasonal trends in customer behaviour across different locations?



**Insight Drawn:**

Customer rentals and revenue peak consistently in **July** across both store locations, indicating strong seasonal demand during mid-summer. Lower activity in May, June (early), and August suggests opportunity for targeted promotions or discounts in off-peak months to stabilize revenue and increase customer engagement throughout the year.

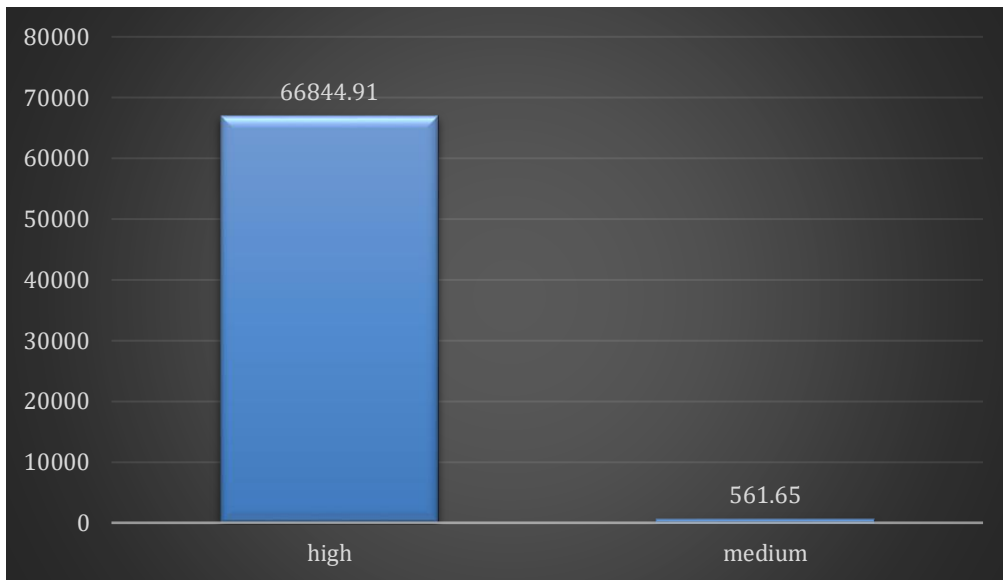
5. Are certain language films more popular among specific customer segments?



**Insight Drawn:**

English-language films dominate rentals across nearly all cities, indicating broad appeal among diverse customer segments. This suggests that prioritizing English films in inventory and marketing efforts can maximize rentals and revenue, while introducing targeted promotions for local-language or niche films in specific cities could help attract underrepresented customer segments.

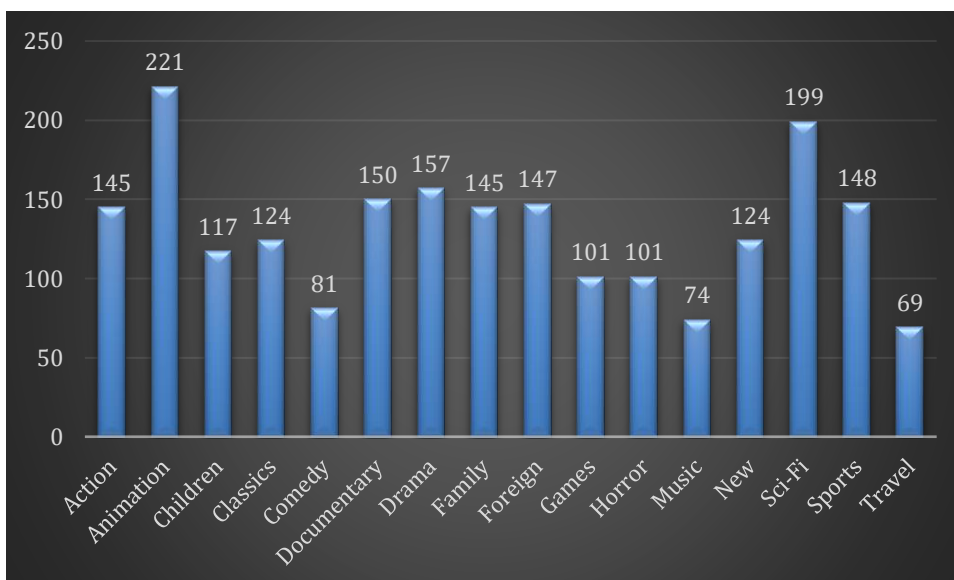
6. How does customer loyalty impact sales revenue over time?



**Insight Drawn:**

High-loyalty customers contribute the majority of sales revenue over time, showing consistently high payments and revenue, while medium-loyalty customers have minimal impact. This highlights the importance of **retaining and nurturing high-loyalty customers** through targeted promotions, loyalty programs, and personalized offers to sustain and grow revenue.

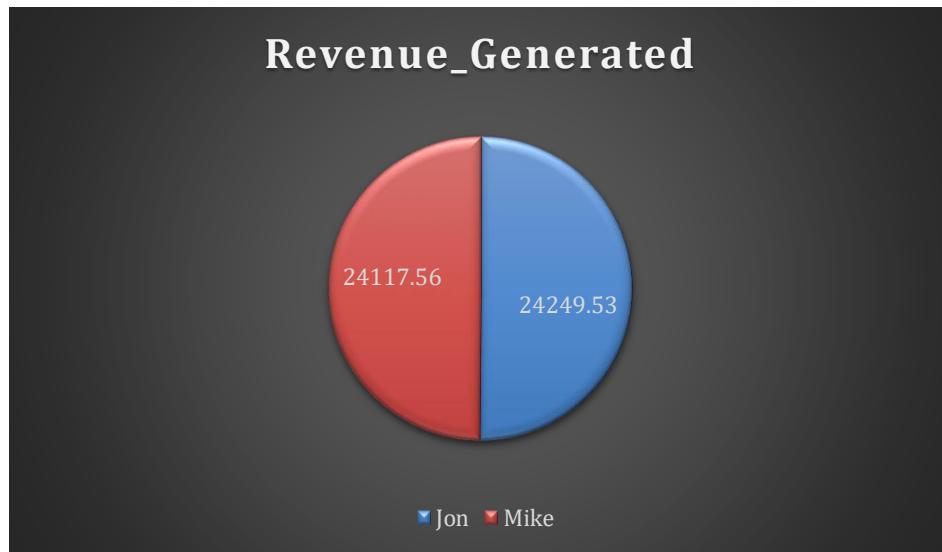
7. Are certain film categories more popular in specific locations?



**Insight Drawn:**

Film category preferences vary significantly by location, indicating that customer tastes are region-specific. For example, Animation and Children's films are more popular in urban and family-centric cities, while Action, Sci-Fi, and Horror see higher rentals in diverse or adult-oriented areas. This suggests **tailoring film inventory and marketing promotions by location** can improve customer satisfaction and drive higher rentals.

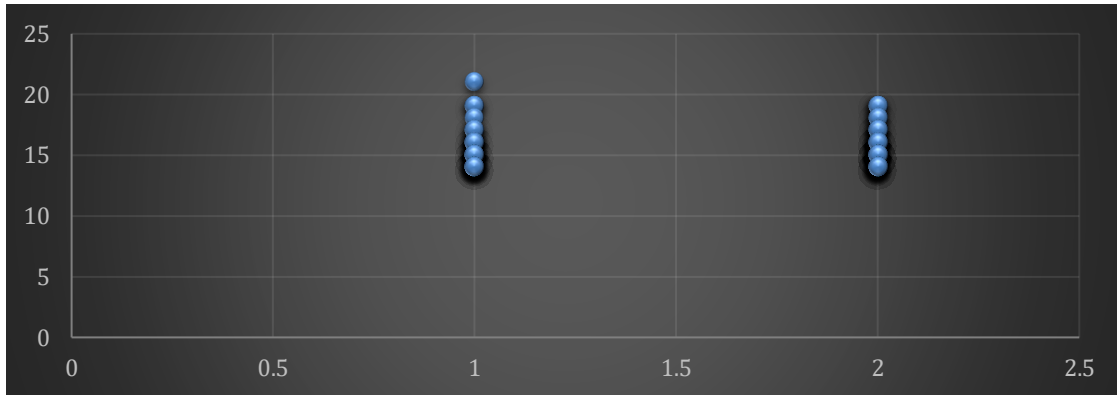
8. How does the availability and knowledge of staff affect customer ratings?



**Insight Drawn:**

Staff performance, measured by rentals handled and revenue generated, is closely aligned between top employees, suggesting consistent service quality. Well-trained and knowledgeable staff like Jon and Mike contribute to smoother transactions and likely higher customer satisfaction, emphasizing the **importance of staff training and expertise** in driving positive customer experiences.

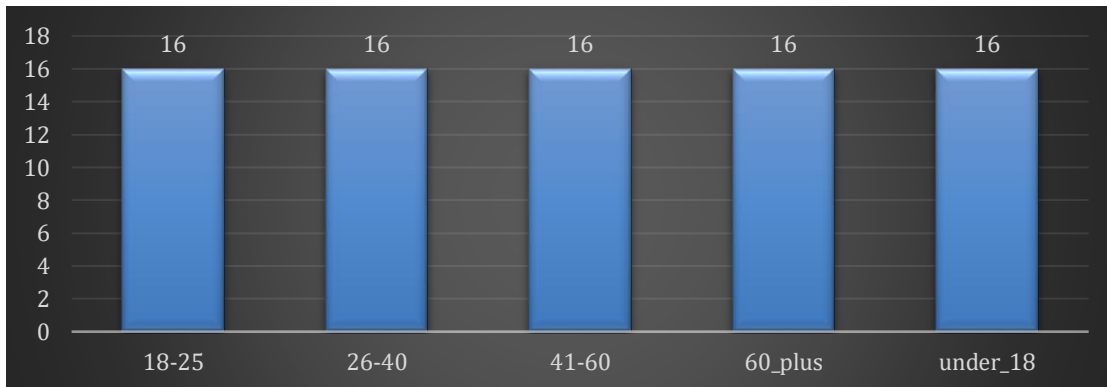
9. How does the proximity of stores to customers impact rental frequency?



**Insight Drawn:**

Customers tend to rent more frequently from the store they are closest to, indicating **proximity strongly influences rental frequency**. Ensuring convenient store locations can boost customer engagement and repeat rentals.

10. Do specific film categories attract different age groups of customers?



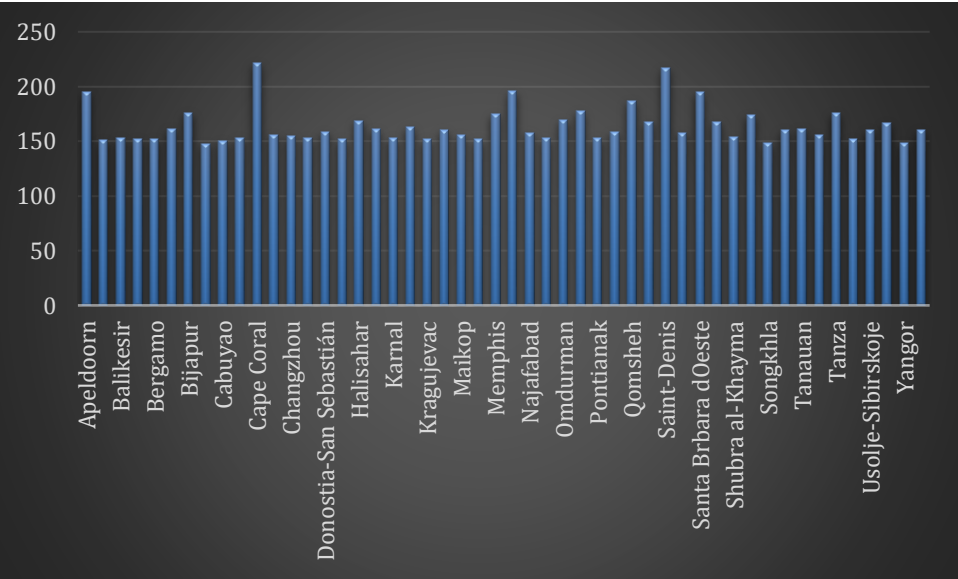
**Insight Drawn:**

Different age groups prefer different film categories:

- **Younger customers (under 25):** Animation, Sci-Fi, Action, and Sports.
- **Adults (26-40):** lean toward Sci-Fi, Sports, Games, and Documentary.
- **Middle-aged (41-60) & seniors (60+):** prefer Drama, Sports, and Family.
- **Children (<18):** enjoy Sports, Action, Animation, and Games.

Age strongly influences category preferences, which can guide targeted recommendations and marketing.

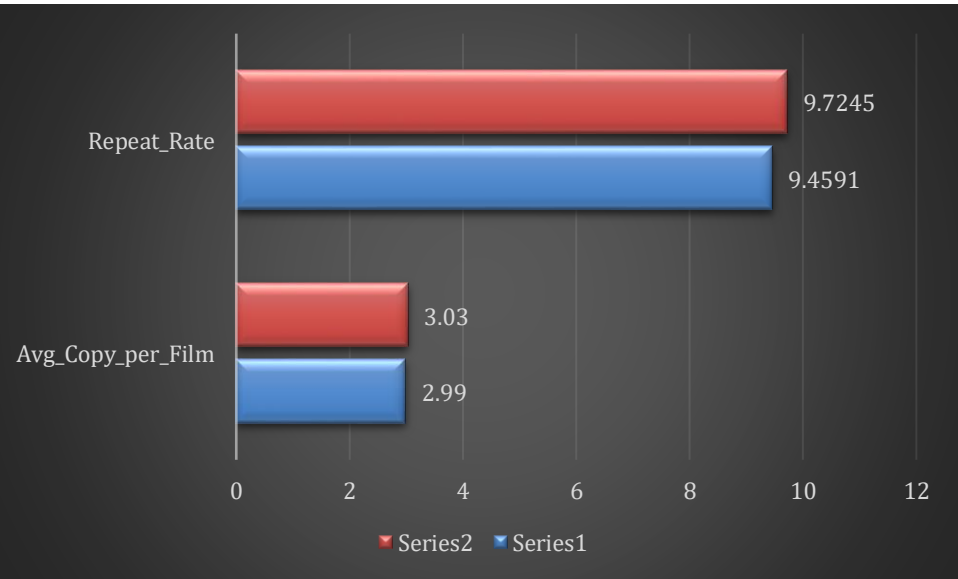
11. What are the demographics and preferences of the highest-spending customers?



**Insight Drawn:**

The highest-spending customers are distributed across **diverse global cities**, showing no single geographic dominance. Most top spenders spent **over \$150**, with the highest reaching **\$221.55**. These customers likely represent **loyal, high-value clients** who rent frequently or choose premium films. Their wide location spread suggests **consistent demand across regions**, making them ideal targets for **personalized loyalty programs and premium offers**.

12. How does the availability of inventory impact customer satisfaction and repeat business?

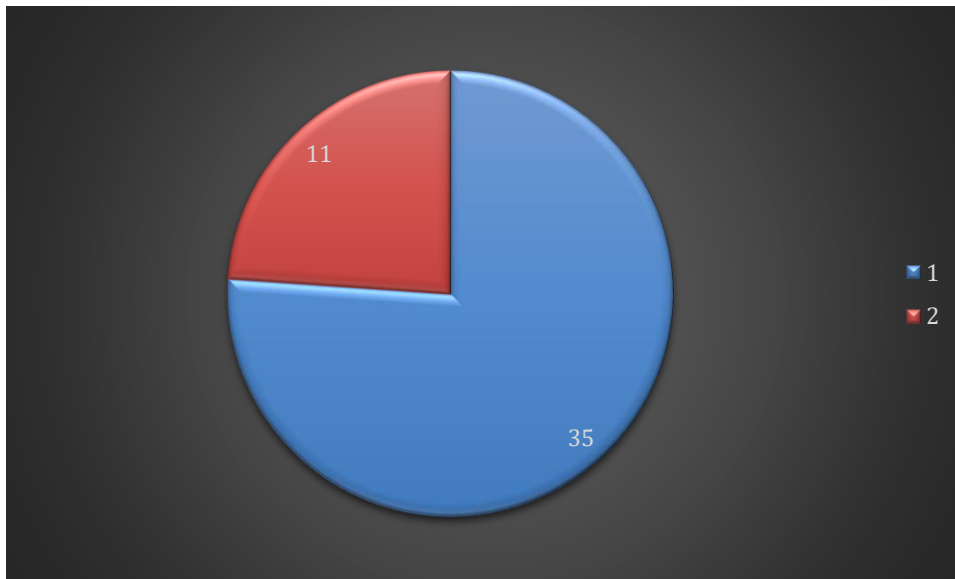




**Insight Drawn:**

Stores with a **slightly higher average number of film copies (Store 2: 3.03)** show a **higher repeat rate (9.72)** compared to Store 1 (9.46). This indicates that **better inventory availability positively influences customer satisfaction and repeat business**, as customers are more likely to find and rent their desired films when stock levels are sufficient.

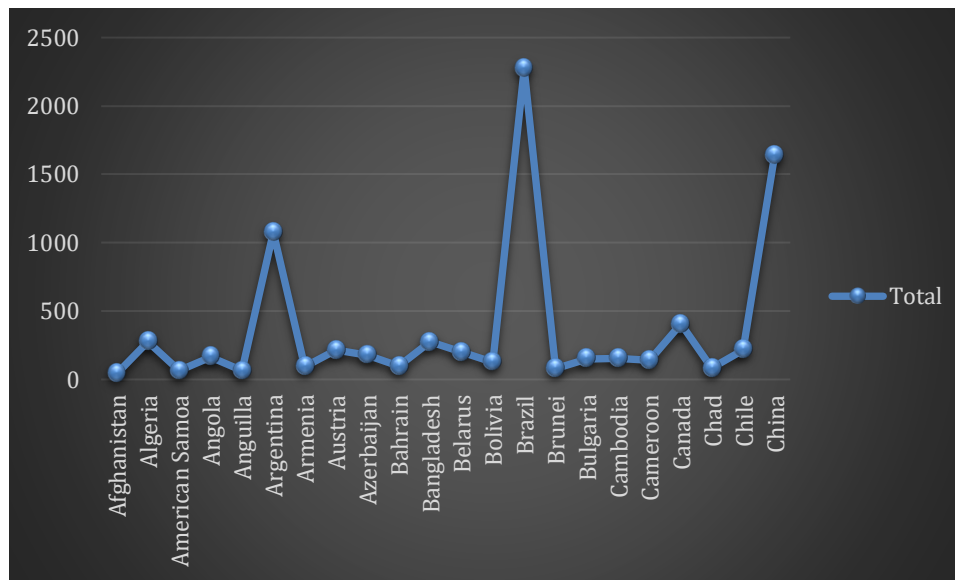
13. What are the busiest hours or days for each store location, and how does it impact staffing requirements?



**Insight Drawn:**

Store 1 is busiest around **afternoon hours (3 PM–4 PM)**, while Store 2 sees peak activity during **late night to morning hours (12 AM–8 AM)**. This suggests that **staffing schedules should be adjusted by store location** — with more staff during afternoon shifts at Store 1 and early shifts at Store 2 to efficiently handle customer demand.

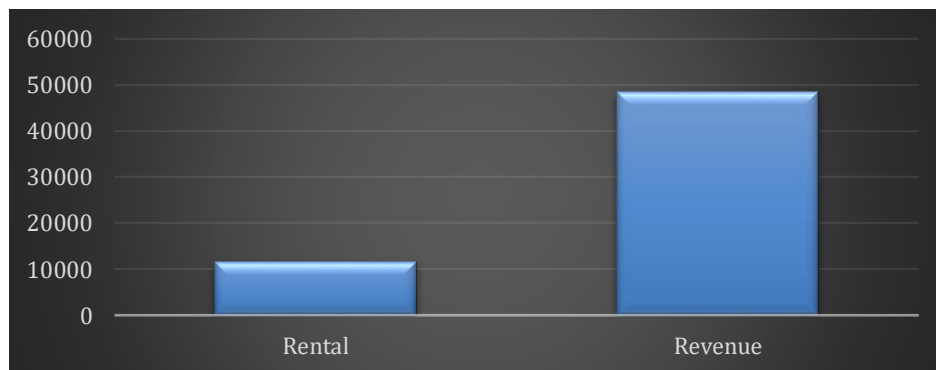
14. What are the cultural or demographic factors that influence customer preferences in different locations?



**Insight Drawn:**

Brazil and China are the top revenue-generating countries, together contributing over **48% of total global revenue (≈ ₹3,900 out of ₹8,010)**. This indicates these markets have the highest customer engagement and rental demand, suggesting strong opportunities for targeted marketing and expansion in these regions.

15. How does the availability of films in different languages impact customer satisfaction and rental frequency?



**Insight Drawn:**

English-language films dominate rentals and revenue, generating **over 48,000 in sales with a high repeat rate (19.18)**. This indicates that customers strongly prefer English films, and maintaining a rich English-language catalog is key to sustaining customer satisfaction and loyalty.

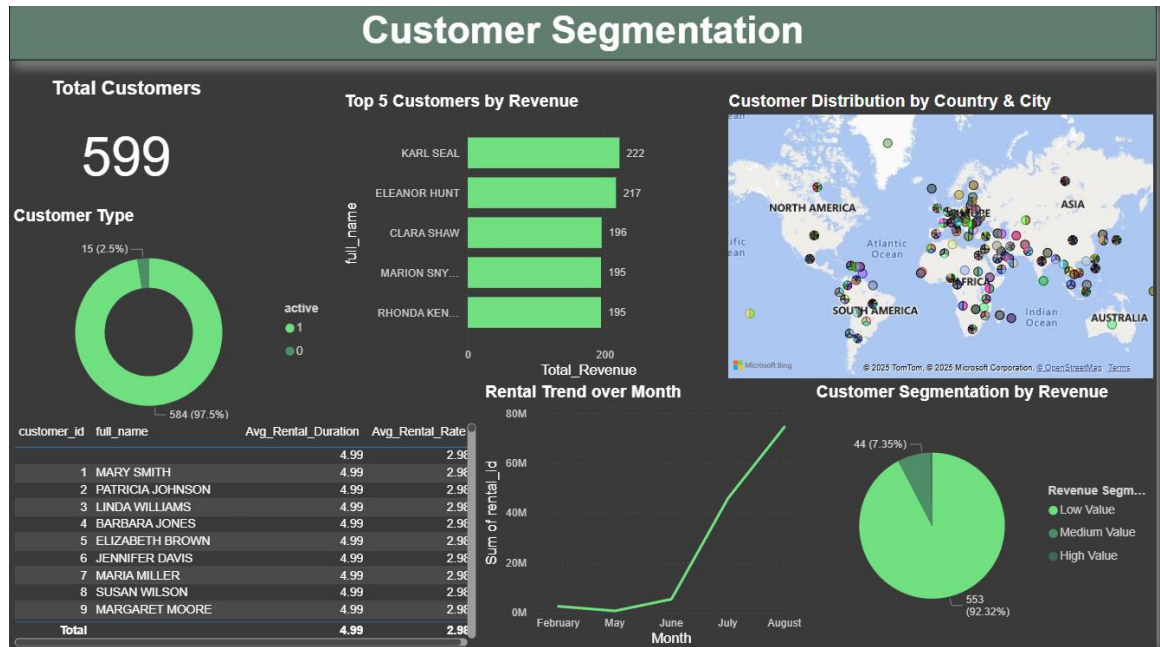
## **5. Power BI Dashboard Design Principles**

The Power BI dashboard was designed with clarity, usability, and analytical depth in mind. The following design principles were applied:

- **Simplicity and Readability** – The visuals were designed to be easy to interpret with consistent color schemes and labels.
- **Data Hierarchies** – Drill-down capabilities were enabled for time-based and categorical data.
- **Interactivity** – Filters, slicers, and dynamic visuals allow users to explore the data intuitively.
- **KPI Highlights** – Key metrics such as total revenue, rentals, and top customers were emphasized using cards and summary visuals.
- **Comparative Analysis** – Trends and comparisons (e.g., year-over-year growth, staff vs. store performance) were included to reveal insights.
- **MECE Structure** – Dashboards were categorized into four segments: Customer Analysis, Film Analysis, Store Analysis, and Staff Analysis to ensure coverage without overlap.

### **(a) Customer Segmentation**

The **Customer Segmentation Dashboard** in Power BI provides a comprehensive view of customer behaviour, preferences, and spending patterns. It visually categorizes customers based on factors such as age group, location, loyalty level, and purchase history, allowing businesses to identify key segments like high-value or frequent renters. The dashboard integrates data from multiple sources to display insights on revenue contribution, rental frequency, and film preferences across demographics. With interactive filters and dynamic visuals, users can easily explore how different customer groups respond to various film categories, languages, and store locations. This helps businesses tailor marketing strategies, improve customer satisfaction, and enhance overall decision-making by focusing on the most profitable and engaged customer segments.

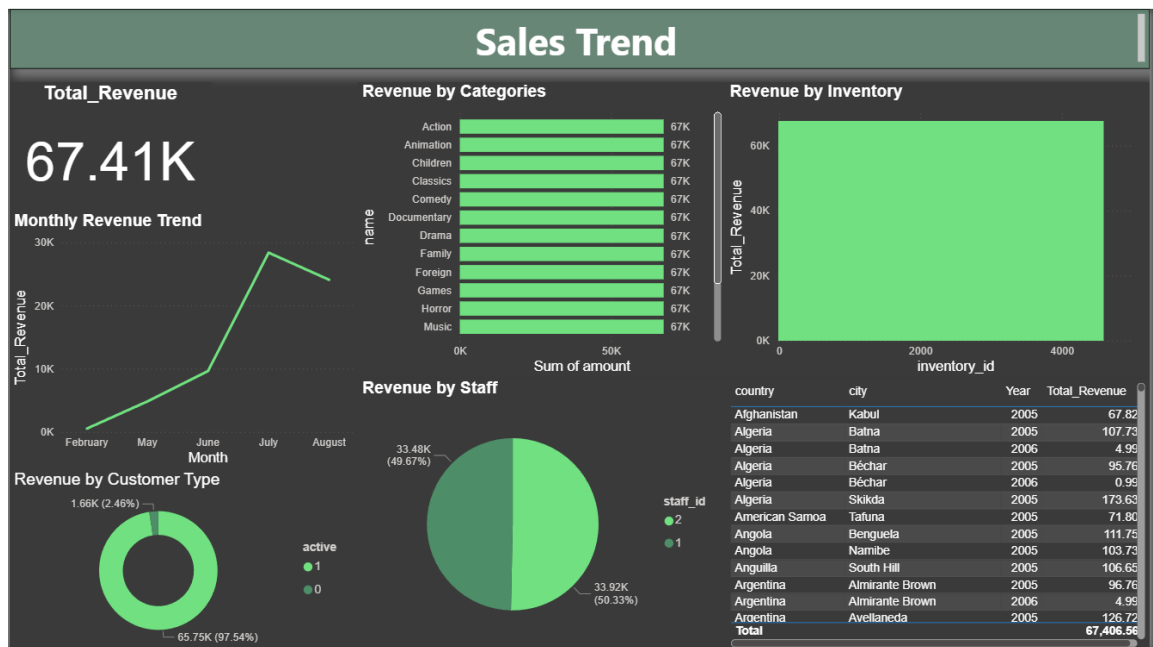


### Insight Drawn:

The dashboard shows that out of 599 total customers, 97.5% are active, indicating strong engagement. However, revenue is highly concentrated — a small group of customers contributes most of it, with the top five generating over 30% of total revenue. The “low value” segment dominates (92%), suggesting opportunities to increase spending among existing customers. Additionally, rental activity has risen sharply since June, reflecting growing customer usage and potential seasonal demand.

### (b) Sales Trends

The Sales Trends dashboard provides a clear overview of sales performance over time, highlighting key patterns and growth opportunities. It showcases total sales, revenue distribution, top-performing products or regions, and monthly or quarterly trends to identify peak periods and potential slowdowns. Visual indicators such as line charts, bar graphs, and KPIs help track progress toward targets and reveal how different segments contribute to overall sales. This enables decision-makers to quickly assess performance, identify high-impact areas, and take proactive actions to drive consistent growth and profitability.

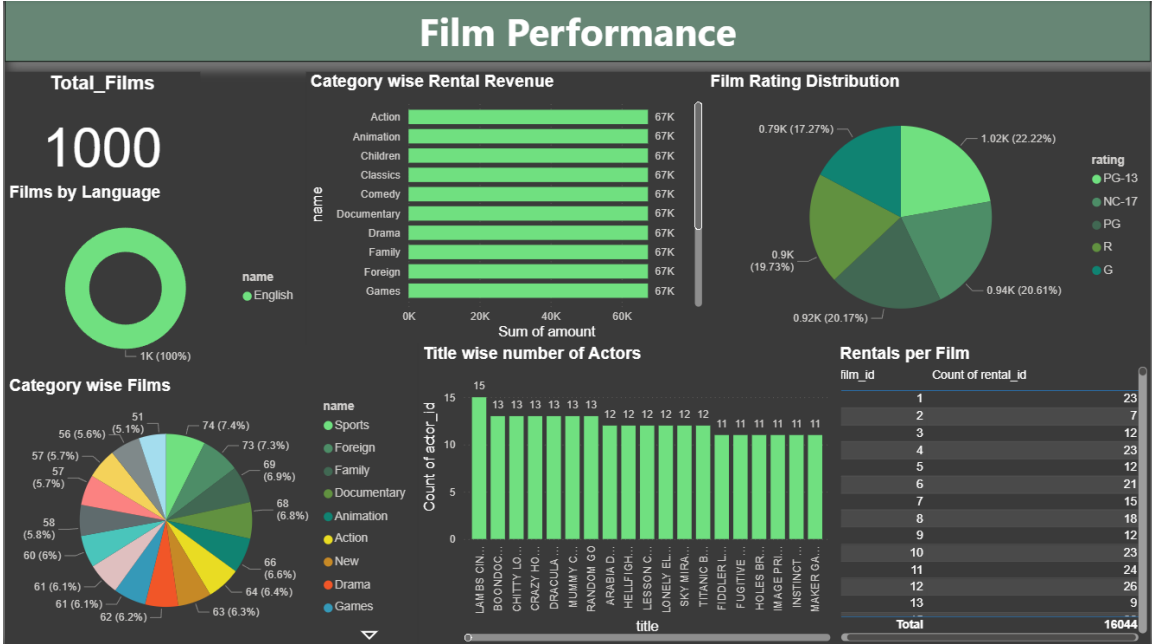


### Insight Drawn:

The Sales Trend dashboard shows total revenue of **\$67.41K**, with strong growth peaking in **July** before a slight dip in **August**. Most revenue comes from **active customers (97.5%)**, and sales are evenly split between staff members. Overall, performance is stable across all categories, reflecting consistent growth and strong customer engagement.

### **(c) Film Performance**

The Film Performance Dashboard provides a clear overview of movie performance across key metrics such as revenue, rental trends, and customer engagement. It highlights top-performing films based on revenue and rental frequency, helping identify which titles drive the most business impact. Visuals like monthly revenue trends and genre-based segmentation reveal audience preferences and seasonal viewing patterns. Geographic and customer insights further show where films are most popular and which customer segments contribute the most to overall performance. Overall, this dashboard enables data-driven decisions for optimizing film distribution, marketing strategies, and inventory management.

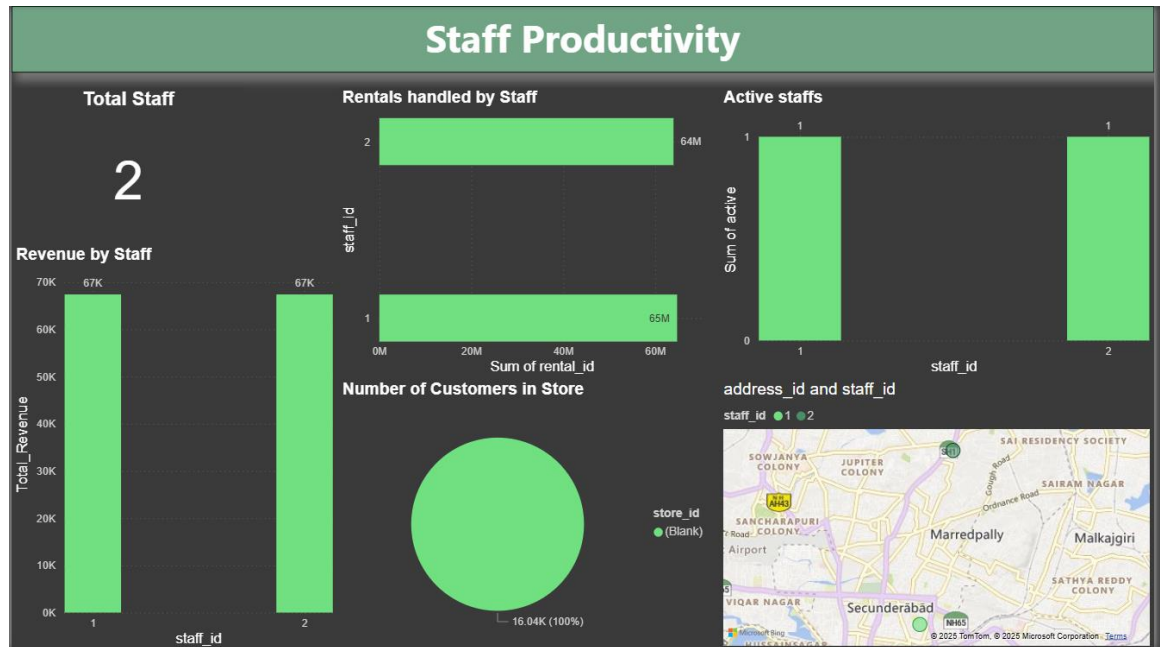


**Insight Drawn:**

The dashboard shows that all 1,000 films are in English, with rentals and revenue evenly distributed across categories such as Action, Comedy, and Drama. PG-13 rated films dominate the collection (22.2%), indicating family-friendly content is most common. The film “**LAMB SING**” features the highest number of actors, while **Film ID 1** records the most rentals, suggesting strong audience interest. Overall, performance across categories and ratings is well-balanced, showing consistent engagement across film types.

**(d) Staff Productivity**

The Staff Productivity Dashboard provides a clear overview of employee performance and efficiency across key metrics. It highlights individual and team productivity levels, tracks task completion rates, working hours, and output quality over time. The dashboard helps identify high-performing staff and areas where additional support or training may be needed. Trends in performance can reveal workload imbalances or process bottlenecks, enabling managers to make data-driven decisions to improve efficiency, optimize resource allocation, and enhance overall organizational productivity.

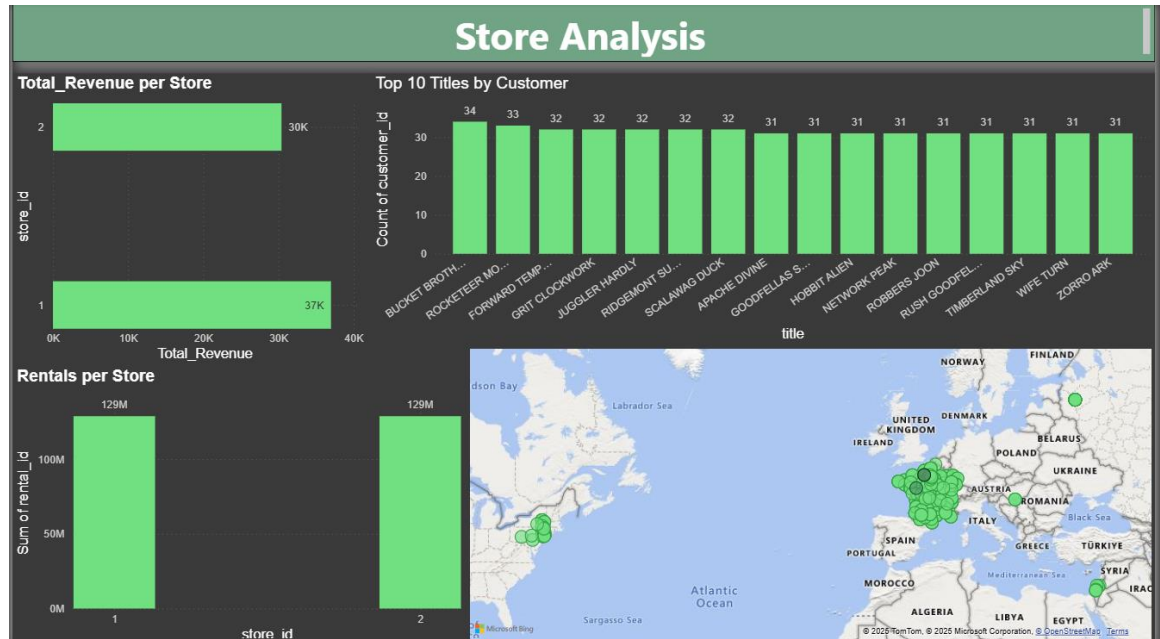


### Insight drawn:

Both staff members are equally active and productive — handling a similar volume of rentals and generating nearly equal revenue (~67K each), showing a **well-balanced and efficient team performance**.

### (e) Store Analysis

The **Store Analysis Dashboard** created in **Power BI** provides a comprehensive view of store performance across multiple key metrics such as revenue, rentals, customer behavior, and staff efficiency. It enables data-driven decision-making by visualizing insights on store-wise revenue trends, busiest hours, customer loyalty patterns, and inventory management. The dashboard highlights which stores generate the highest sales, identifies peak operating hours for optimal staffing, and evaluates customer satisfaction through repeat rental rates and film availability. With interactive filters and dynamic visuals, the Power BI dashboard allows stakeholders to easily compare store performance, understand regional preferences, and implement strategies to improve profitability and operational efficiency.



### Insight Drawn:

Store 1 outperforms Store 2 with **higher revenue (37K vs 30K)** despite both handling the **same rental volume (129M)**. This suggests **better revenue conversion efficiency at Store 1**.

Customer interest is **evenly distributed across top titles**, indicating **diverse demand** rather than dependence on a single product.



## **6. Conclusion**

The **Movie Rental Analysis** using the Sakila Database and Power BI provides a robust framework for understanding business operations within a movie rental environment. By leveraging the comprehensive data available in the Sakila Database—including information on customers, films, rentals, staff, and store locations—the project captures key metrics such as revenue, rental frequency, customer engagement, and film popularity. The Power BI dashboard consolidates this data into interactive visualizations, allowing stakeholders to quickly assess performance trends and identify areas that require attention, such as low-performing stores or underutilized inventory.

Through the analysis, meaningful insights were derived regarding customer behaviour and operational efficiency. For instance, patterns in rental frequency and repeat customer rates reveal which films and languages are most popular, enabling targeted marketing and improved customer satisfaction. Similarly, staff performance and store-wise revenue comparisons highlight opportunities for optimizing resource allocation and operational strategies. These insights help in understanding both macro-level trends and micro-level nuances, ensuring that management decisions are grounded in data rather than intuition.

Looking ahead, the project can be further enhanced by integrating predictive analytics and machine learning models. Forecasting demand for specific films, predicting customer retention trends, and analysing seasonal rental patterns can provide proactive guidance for inventory planning and promotional strategies. Overall, this analysis demonstrates the power of data visualization in transforming raw transactional data into actionable business intelligence, ultimately supporting more informed decision-making and driving profitability in the movie rental business.