DVD Rental Market Insights and Performance Analysis

Introduction

The DVD rental dataset analysis offers an in-depth evaluation of the operational dynamics within a DVD rental business. Utilizing this dataset, the analysis aims to uncover rental trends, customer preferences, film performance metrics, and key financial indicators, which are essential for informed strategic decision-making. By synthesizing data from multiple interconnected tables into a cohesive framework, this analysis facilitates detailed, SQL-driven exploration, enabling the extraction of actionable insights for business optimization.

Objectives

- Consolidate data from the three key tables into a cohesive dataset for efficient analysis.
- Analyze film performance metrics, such as total sales, rental frequency, and average revenue.
- Examine customer behavior patterns to identify retention rates and average spending.
- Explore staff performance metrics, such as revenue contributions by staff members.
- Develop KPIs to evaluate operational efficiency, customer value, and revenue growth.

Key Analysis Questions

1. Which is the top-performing actors in terms of total sales?
2. Which films are rented the most, and how does that affect total rental revenue?
3. Which customers contribute the most to the revenue, and how can we target high-value customers?
4. What are the trends in film rentals across different months, and how does seasonality impact rental demand?
5. How do film categories compare in terms of total sales and their contribution to overall revenue?
6. Which countries generate the highest average payment amounts, and what insights can we draw from this?

Data Preparation and Transformation

--merged actor, film_actor, film, category, film_category

```
DROP TABLE IF EXISTS merged_actor_film;
create table merged_actor_film as
SELECT distinct
    a.actor_id,
    a.actor_name,
    a.film_info,
    f.film_id,
    f.title AS film_title,
    f.description AS film_description,
    f.length AS film_length,
    f.replacement_cost,
    f.rating,
    f.rental_duration,
    f.rental_rate,
    f.special_features,
    c.category_name,
    c.total_sales
FROM
    actor a
JOIN
    film_actor fa ON a.actor_id = fa.actor_id
JOIN
    film f ON fa.film_id = f.film_id
JOIN
    film_category fc ON f.film_id = fc.film_id
JOIN
    category c ON fc.category_id = c.category_id;
```

```
--merged staff, payment, rental, inventory
DROP TABLE IF EXISTS merged_staff_payment_rental;
create table merged_staff_payment_rental as
SELECT distinct
    CONCAT(st.first_name, ' ', st.last_name) AS staff_name,
    st.email AS staff_email,
    p.amount AS payment_amount,
    p.customer_id,
    i.film_id,
    r.rental_date,
    r.return_date
FROM
    staff st
JOIN
    payment p ON st.staff_id = p.staff_id
JOIN
    rental r ON p.rental_id = r.rental_id
JOIN
    inventory i on i.inventory_id = r.inventory_id


--merged customer, address, city, country
DROP TABLE IF EXISTS merged_customer;
create table merged_customer as
SELECT distinct
    c.customer_id,
    c.customer_name,
    c.customer_email,
    c.customer_address,
```

```
    c.customer_zip_code,
    a.district as customer_district,
    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;
```

Data Analysis and Insights

Key Performance Indicators (KPI):

1. Total Revenue
2. Average Revenue Per Customer (ARPC)
3. Customer Lifetime Value (CLV)

```
--Total Revenue (KPI)
SELECT cast(SUM(payment_amount)as float) AS total_revenue
FROM merged_staff_payment_rental;

--Average Revenue Per Customer (ARPC)(KPI)
SELECT cast(ROUND(SUM(payment_amount) / COUNT(DISTINCT customer_id), 2)as float) AS
average_revenue_per_customer
FROM merged_staff_payment_rental;

--Customer Lifetime Value (CLV)(KPI)
```

```
WITH customer_revenue AS (
    SELECT customer_id, SUM(payment_amount) AS total_revenue
    FROM merged_staff_payment_rental
    GROUP BY customer_id
),
avg_revenue AS (
    SELECT AVG(total_revenue) AS avg_revenue_per_customer
    FROM customer_revenue
),
avg_rentals AS (
    SELECT AVG(rental_count) AS avg_rentals_per_customer
    FROM (
        SELECT customer_id, COUNT(*) AS rental_count
        FROM merged_staff_payment_rental
        GROUP BY customer_id
    ) AS rental_data
)
SELECT cast(ROUND(ar.avg_revenue_per_customer * arpc.avg_rentals_per_customer, 2)as float) AS customer_lifetime_value
FROM avg_revenue ar, avg_rentals arpc;
```

Top-Performing Actors Based on Total Sales

Objective: To identify the top 10 actors whose films have generated the highest total sales, helping to recognize the most commercially successful actors in the dataset.

```
--Top-performing actors based on total sales
SELECT actor_name, cast(SUM(total_sales)as float) AS total_sales
FROM merged_actor_film
GROUP BY actor_name
ORDER BY total_sales DESC
```

```
LIMIT 10;
```

Most Rented Films by Title

Objective: To identify the top 10 most rented films based on rental frequency, providing insights into the most popular films among customers.

```
-- Most rented films by title

SELECT film_title, cast(COUNT(*)as float) AS rental_count

FROM merged_staff_payment_rental sr

JOIN merged_actor_film af ON sr.film_id = af.film_id

GROUP BY film_title

ORDER BY rental_count DESC

LIMIT 10;
```

Revenue Contribution by Each Customer

Objective: To determine the top 10 customers based on their total contribution to revenue, helping to identify high-value customers who generate the most income.

```
--Revenue contribution by each customer

SELECT c.customer_name, cast(SUM(sp.payment_amount)as float) AS revenue_contribution

FROM merged_customer c

JOIN merged_staff_payment_rental sp ON c.customer_id = sp.customer_id

GROUP BY c.customer_name

ORDER BY revenue_contribution DESC

limit 10
```

Total Revenue by Rental Year

Objective: To analyze the total revenue generated each year from rentals, providing insights into revenue trends over time.

```
--Total revenue by rental year

SELECT EXTRACT(YEAR FROM rental_date) AS rental_year, cast(SUM(payment_amount)as
float) AS total_revenue

FROM merged_staff_payment_rental

GROUP BY rental_year

ORDER BY total_revenue DESC;
```

Most Active Customers by Rentals per Month

Objective: To identify the top 10 customers based on the number of rentals they make each month, highlighting the most active customers and their rental patterns.

```
--Most Active Customers by Rentals per Month

SELECT c.customer_name,

    cast(EXTRACT(MONTH FROM rental_date)as float) AS rental_month,

    cast(COUNT(*)as float) AS rentals_per_month

FROM merged_customer c

JOIN merged_staff_payment_rental sr ON c.customer_id = sr.customer_id

GROUP BY c.customer_id, c.customer_name, rental_month

ORDER BY rentals_per_month DESC

limit 10
```

Staff Performance Analysis

Objective: To assess the performance of staff members based on the number of rentals they have handled and the total revenue they have generated, helping to identify high-performing staff.

```
--Staff Performance Analysis

SELECT staff_name,

    cast(COUNT(*)as float) AS rentals_handled,
```

```
    cast(SUM(payment_amount)as float) AS total_collected
FROM merged_staff_payment_rental
GROUP BY staff_name
ORDER BY rentals_handled DESC, total_collected DESC;
```

Top Countries by Average Payment Amount

Objective: To identify the top 15 countries based on the average payment amount made by customers, providing insights into regional revenue patterns and customer spending behavior.

```
--Top Countries by Average Payment Amount
SELECT c.customer_country,
    cast(round(AVG(sp.payment_amount),2)as float) AS avg_payment
FROM merged_customer c
JOIN merged_staff_payment_rental sp ON c.customer_id = sp.customer_id
GROUP BY c.customer_country
ORDER BY avg_payment DESC
limit 15
```

Revenue Contribution by Staff

Objective: To analyze the total revenue generated by each staff member, identifying which staff contribute the most to overall revenue.

```
--Revenue Contribution by Staff
SELECT staff_name,
    cast(SUM(payment_amount)as float) AS revenue_generated
FROM merged_staff_payment_rental
GROUP BY staff_name
ORDER BY revenue_generated DESC;
```

Films That Generate the Most Repeat Rentals

Objective: To identify the top 15 films that generate the most repeat rentals, providing insights into customer preferences and the popularity of films over time.

```
--Films That Generate the Most Repeat Rental
SELECT af.film_title,
    cast(COUNT(*)as float) AS repeat_rentals
FROM merged_actor_film af
JOIN merged_staff_payment_rental sp ON af.film_id = sp.film_id
GROUP BY af.film_title
HAVING COUNT(*) > 1
ORDER BY repeat_rentals DESC
limit 15
```

Seasonal Trends in Film Rentals

Objective: To analyze the seasonal trends in film rentals by month, identifying peak rental periods and potential seasonality patterns in customer behavior.

```
--Seasonal Trends in Film Rentals
SELECT EXTRACT(MONTH FROM sr.rental_date) AS rental_month,
    cast(COUNT(*)as float) AS rentals
FROM merged_staff_payment_rental sr
GROUP BY rental_month
ORDER BY rentals DESC;
```

Percentage of Total Sales by Film Category

Objective: To analyze the contribution of each film category to the overall total sales, providing insights into which categories dominate sales and their market share.

```
--Percentage of Total Sales by Film Category
```

```
SELECT category_name,
    cast(SUM(total_sales)as float) AS total_sales,
    cast(ROUND(SUM(total_sales) * 100.0 / SUM(SUM(total_sales)) OVER (), 2)as float) AS
percentage_of_sales
FROM merged_actor_film
GROUP BY category_name
ORDER BY total_sales DESC;
```

Most Profitable Rental Rates by Film Category

Objective: To identify the film categories with the highest average rental rates, providing insights into the most profitable categories in terms of rental pricing.

```
--Most Profitable Rental Rates by Film Categor
SELECT category_name,
    cast(AVG(rental_rate)as float) AS avg_rental_rate
FROM merged_actor_film
GROUP BY category_name
ORDER BY avg_rental_rate DESC;
```

Film Titles with the Longest Average Rental Period

Objective: To identify the top 10 film titles with the longest average rental duration, providing insights into which films are rented for the longest periods.

```
--Film Titles with the Longest Average Rental Period
SELECT af.film_title,
    cast(ROUND(AVG(EXTRACT(EPOCH FROM (sr.return_date - sr.rental_date)) / 3600), 2)as
float) AS avg_rental_duration_hours
FROM merged_actor_film af
JOIN merged_staff_payment_rental sr ON af.film_id = sr.film_id
GROUP BY af.film_title
```

```
ORDER BY avg_rental_duration_hours DESC
LIMIT 10;
```

Revenue Distribution Across Rental Durations

Objective: To analyze how revenue is distributed across different rental durations, identifying which rental durations generate the highest total revenue and the most rentals.

```
--Revenue Distribution Across Rental Durations
SELECT rental_duration::text,
    cast(SUM(rental_rate)as float) AS total_revenue,
    cast(COUNT(*)as float) AS rental_count
FROM merged_actor_film
GROUP BY rental_duration
ORDER BY total_revenue DESC;
```

Top Actors by Film Rentals

Objective: To identify the top 10 actors based on the total number of rentals their films have generated, highlighting the most rented films and their associated actors.

```
--Top Actors by Film Rentals
SELECT af.actor_name,
    cast(COUNT(sr.film_id)as float) AS total_rentals
FROM merged_actor_film af
JOIN merged_staff_payment_rental sr ON af.film_id = sr.film_id
GROUP BY af.actor_name
ORDER BY total_rentals DESC
LIMIT 10;
```

Insights

1. Total revenue is $61,312.04, with an average revenue of $102.36 per customer and a customer lifetime value of $2,494.17, highlighting the importance of customer retention for maximizing long-term profitability.

2. Titanic Boondock and Telemark Heartbreakers lead with 264 rentals each. Top customers like Eleanor Hunt ($211.55) and Karl Seal ($208.58) significantly drive revenue. Susan Davis tops actor sales with $204,853, while staff members Jon Stephens ($31,059.92) and Mike Hillyer ($30,252.12) contribute the most to revenue.

3. Jon Stephens and Mike Hillyer generated $31,059.92 and $30,252.12, respectively. 2005 revenue was $60,797.86, while 2006 dropped to $514.18. Rentals of 6 days earned the most ($3,488.99). Telemark Heartbreakers and Titanic Boondock led with 264 repeat rentals each.

4. Top actors by rentals: Susan Davis (750) and Gina Degeneres (685). *Crusade Honey* had the longest rental (175.8 hours). Travel and Games have the highest rental rates ($3.30). July (6,713) and August (5,686) are peak rental months.

5. Top countries by payment: Nepal ($5.52), French Guiana ($4.89). Most active customers: Eleanor Hunt (22/month), Crystal Ford (21/month). Sports lead in sales (10.22%), followed by Foreign (7.4%).

Conclusion

The DVD rental analysis highlights critical operational and financial insights essential for driving strategic decision-making. By leveraging consolidated data and targeted SQL queries, this study provides a comprehensive view of performance metrics across films, customers, and staff.

Key findings include:

Revenue Drivers: Top-performing films, actors, and rental trends across years reveal high-impact assets that should be prioritized for future inventory and marketing efforts.

Customer Insights: Analysis of high-value customers and regional payment trends enables targeted marketing strategies and personalized service offerings to enhance retention and maximize revenue.

Operational Efficiency: Staff performance metrics and revenue contributions provide a foundation for evaluating operational effectiveness and designing incentive programs.

```
/*
ALTER TABLE public.actor
DROP COLUMN last_update; (deleting column)

DROP TABLE public.actor_details; (deleting table name)

SELECT viewname
FROM pg_views
WHERE definition LIKE '%actor%'; (to check view that are listed to the table)

SELECT *
FROM pg_depend
WHERE refobjid = 'actor'::regclass; (check all dependencies on the table)

DROP TABLE actor CASCADE; (delete table with all dependencies)

ALTER TABLE actors RENAME TO actor; (change table name)

ALTER TABLE actor ADD COLUMN actor_name VARCHAR(255); (used to add new column in table)

update merged_actor_film
set zzzz=concat(category_name, ' ' , actor_name)
*/

--Sales Analysis by Customer Location
/*
SELECT customer_country, customer_city, SUM(payment_amount) AS total_sales
FROM merged_customer c
JOIN merged_staff_payment_rental sp ON c.customer_id = sp.customer_id
```

```
GROUP BY customer_country, customer_city

ORDER BY total_sales DESC;

*/


--Most Frequent Customers by Film Category

/*

SELECT c.customer_name, af.category_name, cast(COUNT(*)as float) AS rental_count

FROM merged_customer c

JOIN merged_staff_payment_rental sr ON c.customer_id = sr.customer_id

JOIN merged_actor_film af ON sr.film_id = af.film_id

GROUP BY c.customer_name, af.category_name

ORDER BY rental_count DESC;

*/
```

Market Dynamics: Seasonal rental trends and repeat rental patterns emphasize opportunities to refine promotional activities and optimize inventory during peak demand periods.

By utilizing these insights, the DVD rental business can implement data-driven strategies to boost revenue, enhance customer satisfaction, and maintain a competitive edge in the market.