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Module 3: Customer Segmentation and Behavioural Analysis

Module 3 focuses on analysing customer behaviour by creating meaningful customer segments using data-driven techniques. This module involves designing analytical attributes such as Guest Type, Customer Clusters, RFM Scores, and Demographic Segmentation to understand how different groups of customers behave.

Using Excel, Power BI, and DAX, this module enhances customer-level intelligence and helps hotels gain insights into guest loyalty, spending patterns, booking preferences, and travel purpose. By applying segmentation techniques, hotels can identify high-value guests, understand customer diversity, and design targeted strategies to improve guest satisfaction and revenue.

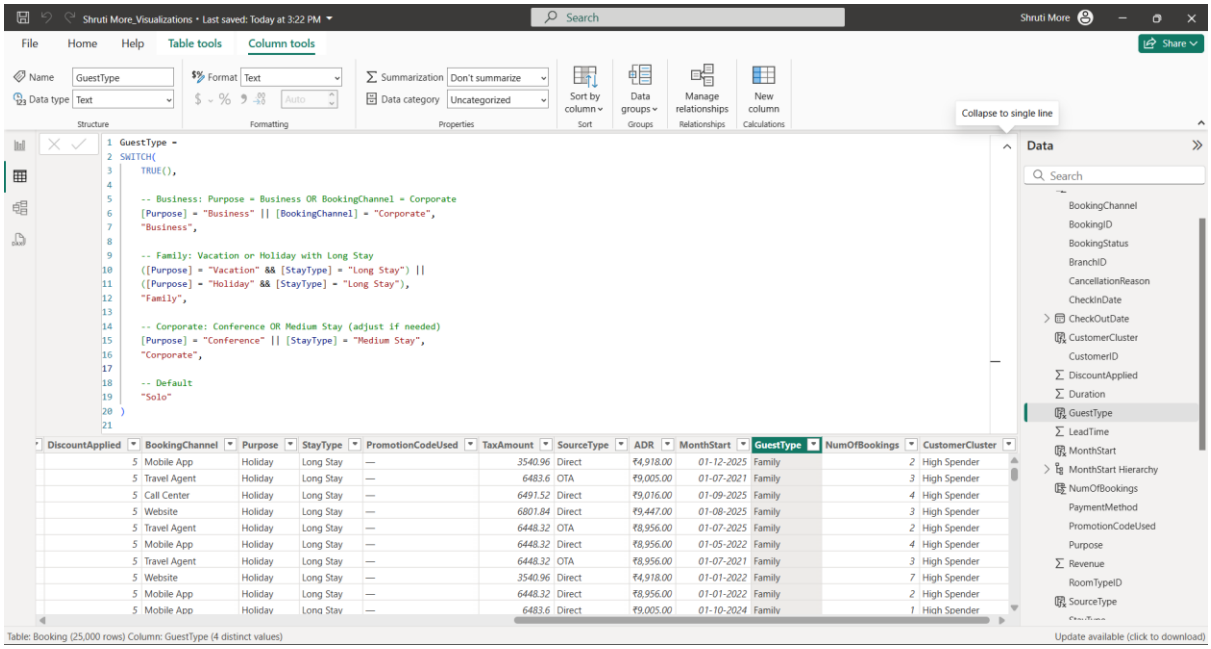
1. Creating GuestType (Customer Persona Classification)

To understand customer behaviour more effectively, a new analytical attribute called GuestType was created in Power BI using a DAX calculated column. This attribute classifies each guest into meaningful personas based on their travel purpose, booking channel, and stay duration.

DAX Formula Used:

```
GuestType =
SWITCH(
    TRUE(),

    -- Business: Purpose = Business OR BookingChannel = Corporate
    [Purpose] = "Business" || [BookingChannel] = "Corporate",
    "Business",

    -- Family: Vacation or Holiday with Long Stay
    ([Purpose] = "Vacation" && [StayType] = "Long Stay") ||
    ([Purpose] = "Holiday" && [StayType] = "Long Stay"),
    "Family",

    -- Corporate: Conference OR Medium Stay
    [Purpose] = "Conference" || [StayType] = "Medium Stay",
    "Corporate",

    -- Default
    "Solo"
```

)



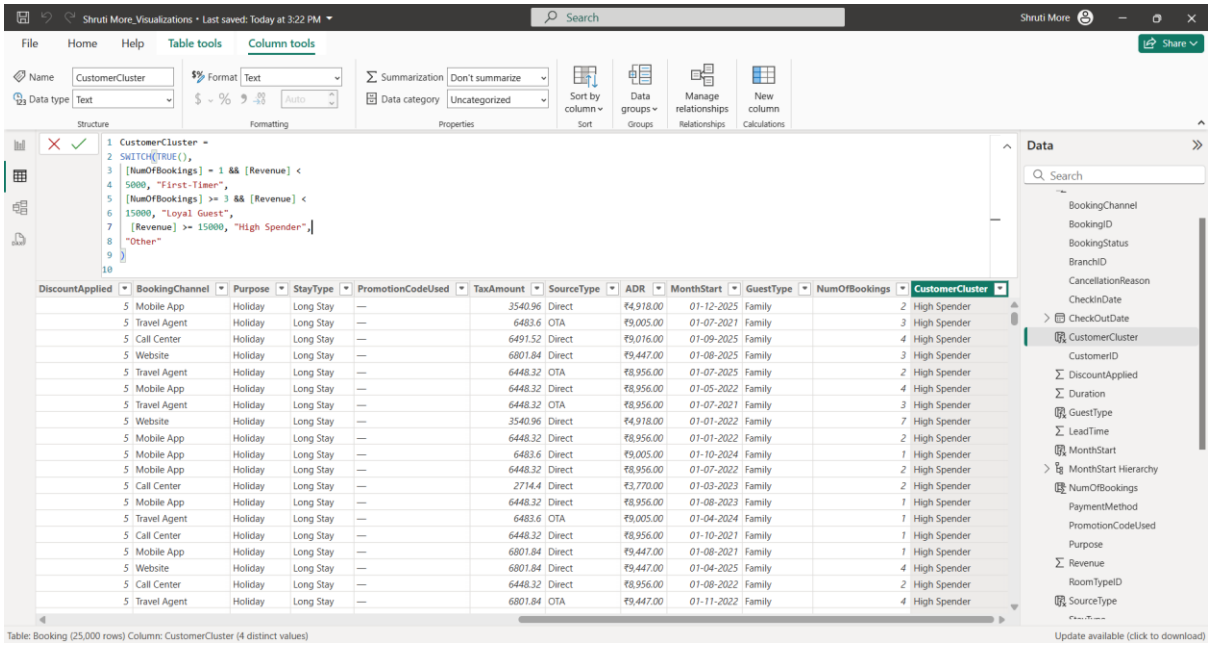
This DAX formula categorizes guests into Business, Family, Corporate, or Solo based on their purpose of visit, stay duration, and booking channel. It helps classify guests for better analysis of customer behavior and hotel trends.

2. CustomerCluster

The CustomerCluster attribute categorizes customers based on their booking frequency and total revenue generated. This segmentation helps identify guest loyalty levels and spending patterns, allowing the hotel to focus on high-value customers and design personalized strategies for each group.

DAX Formula:

```
CustomerCluster =
SWITCH(TRUE(),
    [NumOfBookings] = 1 && [Revenue] < 5000, "First-Timer",
    [NumOfBookings] >= 3 && [Revenue] < 15000, "Loyal Guest",
    [Revenue] >= 15000, "High Spender",
    "Other"
)
```



This formula classifies guests into First-Timer, Loyal Guest, High Spender, or Other based on their booking count and total revenue. It helps the hotel identify guest value segments and understand their long-term contribution.

3. Creating Guest Country

The Guest Country field was created to simulate the geographical origin of guests by randomly assigning a country name to each record. This enhances the dataset for demographic analysis and enables country-wise segmentation, heatmaps, and trend insights in Power BI.

Excel Formula Used

=CHOOSE(RANDBETWEEN(1,46),

"India","United States","United Kingdom","Canada","Australia",

"Germany","France","Italy","Spain","Brazil","Mexico","China",

"Japan","South Korea","Russia","South Africa","Nigeria","Egypt",

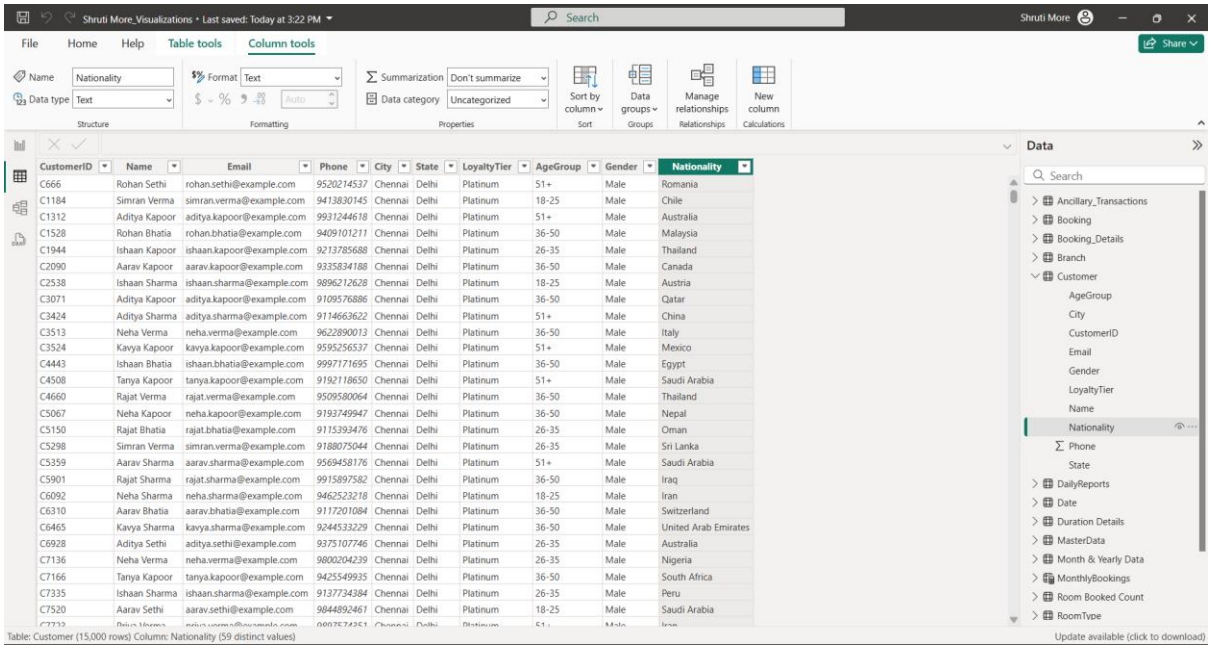
"Kenya","Argentina","Chile","Colombia","Peru","Netherlands",

"Sweden","Norway","Denmark","Finland","Poland","Turkey",

"Saudi Arabia","United Arab Emirates","Israel","Thailand",

"Vietnam","Indonesia","Malaysia","Singapore","Philippines",

"New Zealand","Pakistan","Bangladesh","Sri Lanka","Nepal","Iran")



CustomerID	Name	Email	Phone	City	State	LoyaltyTier	AgeGroup	Gender	Nationality
C666	Rohan Sethi	rohan.sethi@example.com	9520214537	Chennai	Delhi	Platinum	51+	Male	Romania
C1184	Simran Verma	simran.verma@example.com	9413830145	Chennai	Delhi	Platinum	18-25	Male	Chile
C1312	Aditya Kapoor	aditya.kapoor@example.com	9931244618	Chennai	Delhi	Platinum	51+	Male	Australia
C1528	Rohan Bhatia	rohan.bhatia@example.com	9409101211	Chennai	Delhi	Platinum	36-50	Male	Malaysia
C1944	Ishaan Kapoor	ishaan.kapoor@example.com	9213785688	Chennai	Delhi	Platinum	26-35	Male	Thailand
C2090	Aarav Kapoor	aarav.kapoor@example.com	9335834188	Chennai	Delhi	Platinum	36-50	Male	Canada
C2538	Ishaan Sharma	ishaan.sharma@example.com	9896212628	Chennai	Delhi	Platinum	18-25	Male	Austria
C3071	Aditya Kapoor	aditya.kapoor@example.com	9109576886	Chennai	Delhi	Platinum	36-50	Male	Qatar
C3424	Aditya Sharma	aditya.sharma@example.com	9114663622	Chennai	Delhi	Platinum	51+	Male	China
C3513	Neha Verma	neha.verma@example.com	9622890013	Chennai	Delhi	Platinum	36-50	Male	Italy
C3524	Kavya Kapoor	kavya.kapoor@example.com	9595256537	Chennai	Delhi	Platinum	51+	Male	Mexico
C4443	Ishaan Bhatia	ishaan.bhatia@example.com	9997171695	Chennai	Delhi	Platinum	36-50	Male	Egypt
C4508	Tanya Kapoor	tanya.kapoor@example.com	9192118650	Chennai	Delhi	Platinum	51+	Male	Saudi Arabia
C4660	Rajat Verma	rajat.verma@example.com	9509580064	Chennai	Delhi	Platinum	36-50	Male	Thailand
C5067	Neha Kapoor	neha.kapoor@example.com	9193749947	Chennai	Delhi	Platinum	36-50	Male	Nepal
C5150	Rajat Bhatia	rajat.bhatia@example.com	9115393476	Chennai	Delhi	Platinum	26-35	Male	Oman
C5298	Simran Verma	simran.verma@example.com	9188075044	Chennai	Delhi	Platinum	26-35	Male	Sri Lanka
C5359	Aarav Sharma	aarav.sharma@example.com	9569458176	Chennai	Delhi	Platinum	51+	Male	Saudi Arabia
C5901	Rajat Sharma	rajat.sharma@example.com	9915897582	Chennai	Delhi	Platinum	36-50	Male	Iraq
C6092	Neha Sharma	neha.sharma@example.com	9462523218	Chennai	Delhi	Platinum	18-25	Male	Iran
C6310	Aarav Bhatia	aarav.bhatia@example.com	9117201084	Chennai	Delhi	Platinum	36-50	Male	Switzerland
C6465	Kavya Sharma	kavya.sharma@example.com	9244533229	Chennai	Delhi	Platinum	36-50	Male	United Arab Emirates
C6928	Aditya Sethi	aditya.sethi@example.com	9375107746	Chennai	Delhi	Platinum	26-35	Male	Australia
C7136	Neha Verma	neha.verma@example.com	9800204239	Chennai	Delhi	Platinum	26-35	Male	Nigeria
C7166	Tanya Kapoor	tanya.kapoor@example.com	9425549935	Chennai	Delhi	Platinum	36-50	Male	South Africa
C7335	Ishaan Sharma	ishaan.sharma@example.com	9137734384	Chennai	Delhi	Platinum	26-35	Male	Peru
C7520	Aarav Sethi	aarav.sethi@example.com	9844892461	Chennai	Delhi	Platinum	18-25	Male	Saudi Arabia

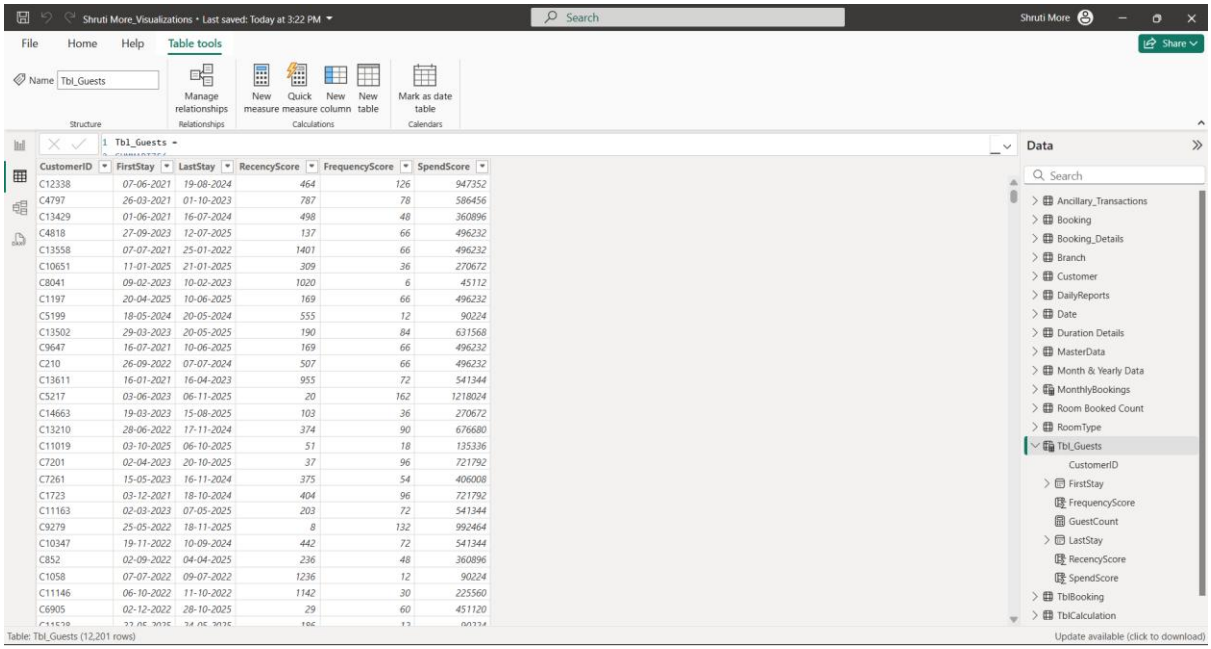
This formula randomly assigns a country from a predefined list using RANDBETWEEN and CHOOSE. It helps create realistic guest demographics for country-wise analysis and visualizations.

4. Guest Summary Table:

The Guest Summary Table aggregates guest-level stay information by summarizing each customer's earliest check-in date and most recent check-out date. This table is useful for understanding guest history, identifying long-term customers, and analysing patterns in first and last visits.

DAX Formula Used

```
Tbl_Guests =
SUMMARIZE(
    'TblBookings',
    'TblBookings'[CustomerID],
    "FirstStay", MIN('TblBookings'[CheckInDate]),
    "LastStay", MAX('TblBookings'[CheckOutDate])
)
```



This DAX formula creates a summary table showing each customer's first and last stay dates using MIN and MAX. It helps track guest visit history and analyse long-term customer relationships.

5. Scoring (RFM Analysis):

To evaluate customer value and behaviour, an RFM scoring model was created using three key metrics:

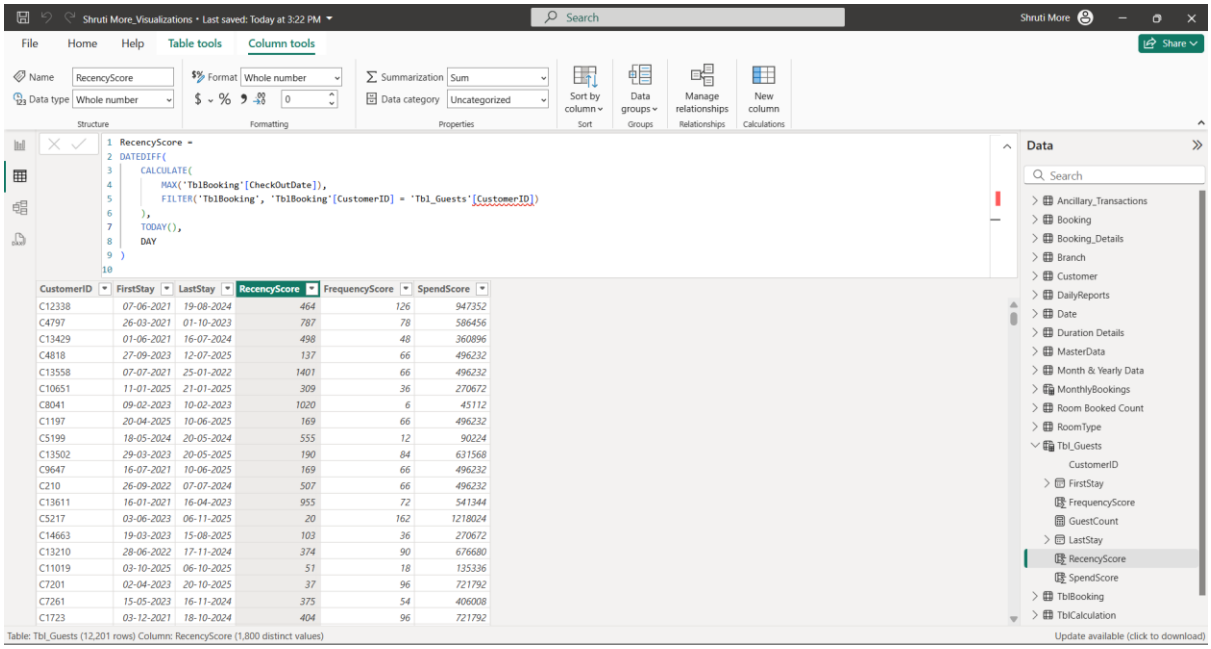
- Recency – how recently a customer stayed
- Frequency – how often they booked
- Monetary (Spend) – total revenue generated

These scores help identify loyal customers, high-value spenders, and inactive guests, improving segmentation and targeted decision-making.

a) Recency Score

DAX Formula

```
RecencyScore =
DATEDIFF(
    CALCULATE(
        MAX('TblBooking'[CheckOutDate]),
        FILTER('TblBooking', 'TblBooking'[CustomerID] = 'Tbl_Guests'[CustomerID])
    ),
    TODAY(),
    DAY
)
```



This formula calculates how many days have passed since a customer's most recent stay. Lower values indicate recently active guests, while higher values show less recent or inactive customers**.**

b) Frequency Score

DAX Formula

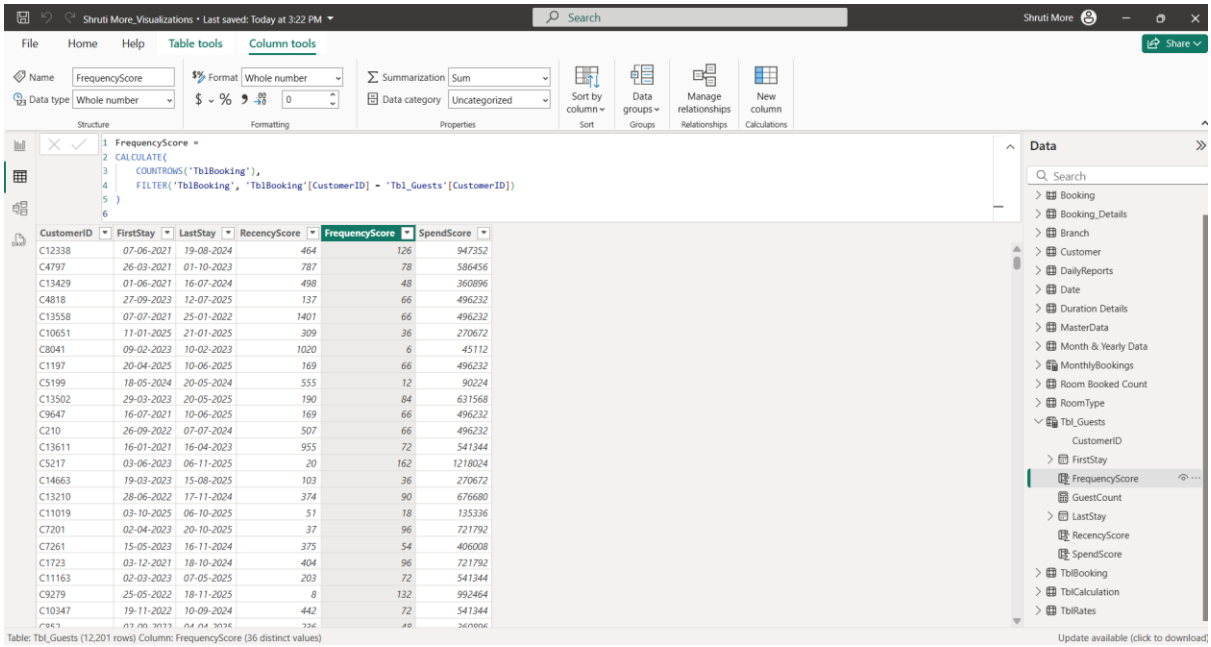
FrequencyScore =

CALCULATE(

COUNTROWS('TblBooking'),

FILTER('TblBooking', 'TblBooking'[CustomerID] = 'Tbl_Guests'[CustomerID])

)

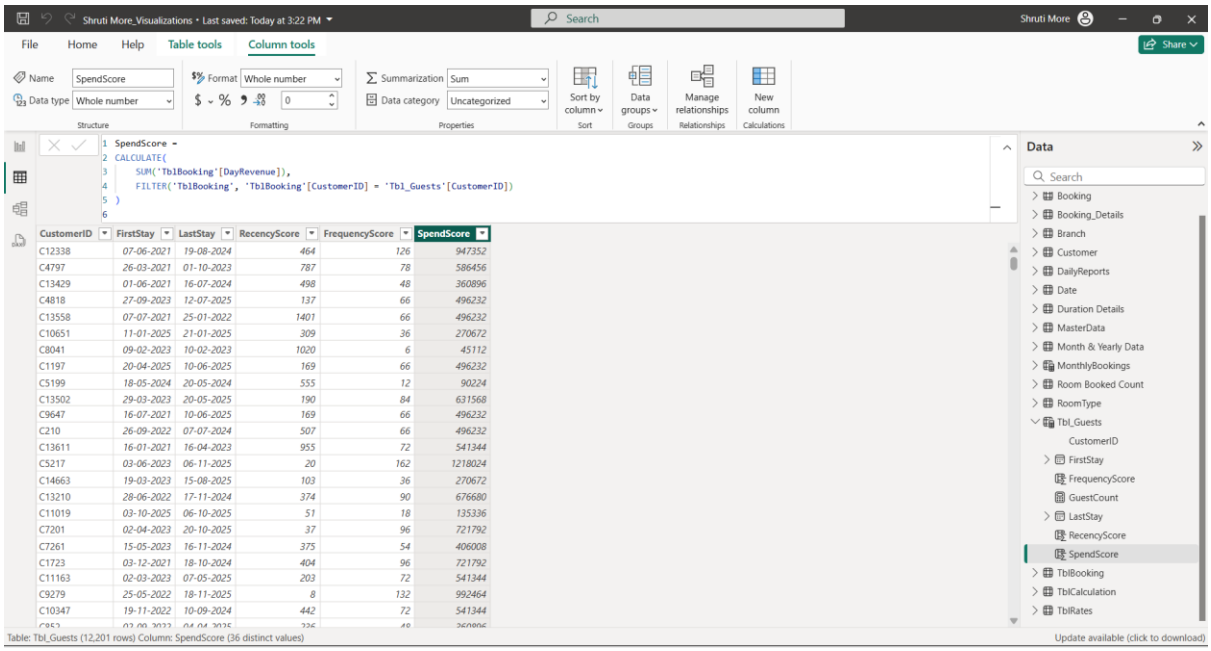


This formula counts how many bookings each customer has made. It helps identify highly frequent guests versus one-time visitors.

c) Spend Score

DAX Formula

```
SpendScore =
CALCULATE(
    SUM('TblBooking'[DayRevenue]),
    FILTER('TblBooking', 'TblBooking'[CustomerID] = 'Tbl_Guests'[CustomerID])
)
```

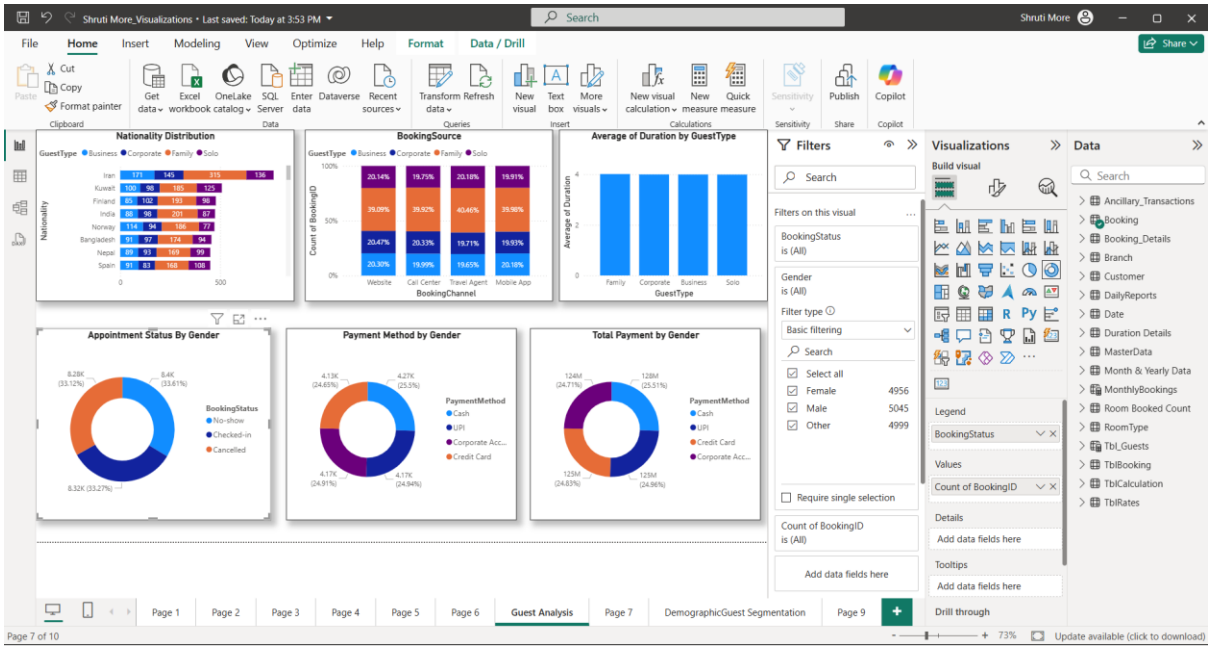


This formula calculates the total revenue generated by each customer across all stays. It highlights high spenders and helps analyse revenue contribution per guest.

Visualization and Analysis: (Output)

6. Visualization & Analysis (Output)

After creating analytical fields like GuestType, CustomerCluster, RFM Scores, and demographic attributes, several Power BI visualizations were created to understand customer behavior and segmentation.
These visuals help interpret patterns in nationality, booking behavior, spending habits, and customer demographics.



a) Nationality Distribution by Guest Type

A clustered bar chart was created to show how different guest personas (Business, Corporate, Family, Solo) are distributed across countries.
This helps identify key international markets contributing to hotel bookings.

b) Booking Source Analysis

A 100% stacked bar chart displays the proportion of bookings made via Website, Call Center, Travel Agent, and Mobile App.
This visualization highlights which channels are most preferred by different guest types.

c) Average Duration by Guest Type

A bar chart shows how long each customer group stays on average.
Family guests typically have longer stays, while Business and Solo travelers have shorter visits.

d) Appointment Status by Gender

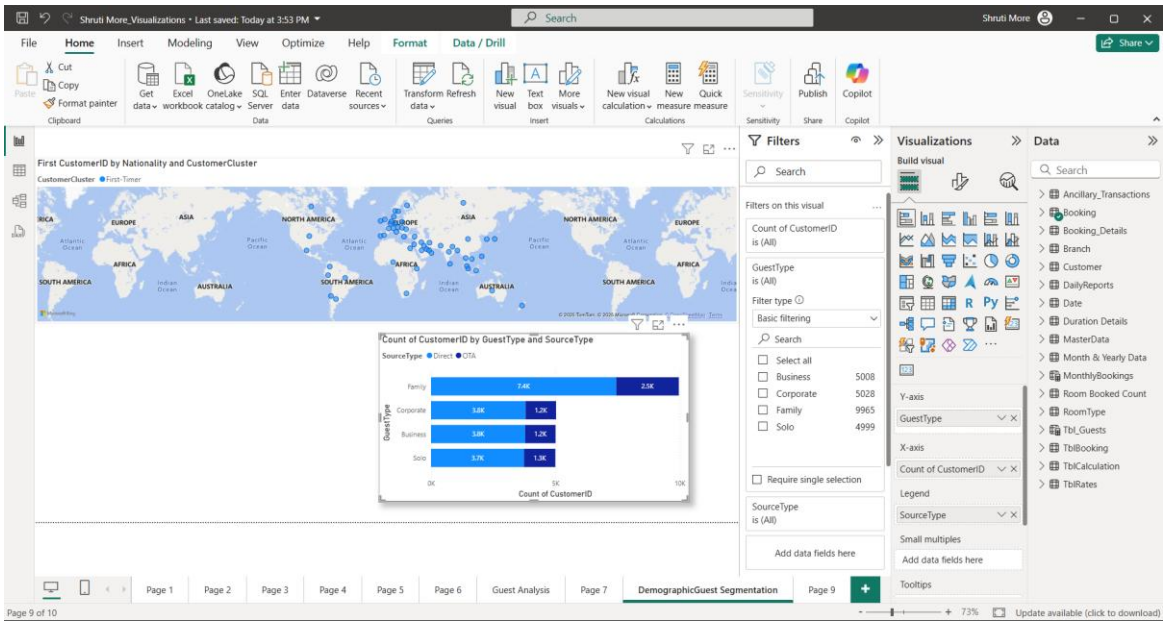
A donut chart illustrates the distribution of Checked-in, No-show, and Cancelled bookings for Male and Female customers.
This helps understand reliability trends based on gender.

e) Payment Method by Gender

Another donut chart shows which payment method (Cash, UPI, Credit Card, Corporate Account) is used more frequently by each gender.
This supports decisions related to billing methods and promotions.

f) Total Payment by Gender

This chart shows total revenue contribution from each gender by payment mode.
It helps identify spending behavior and possible high-value segments.

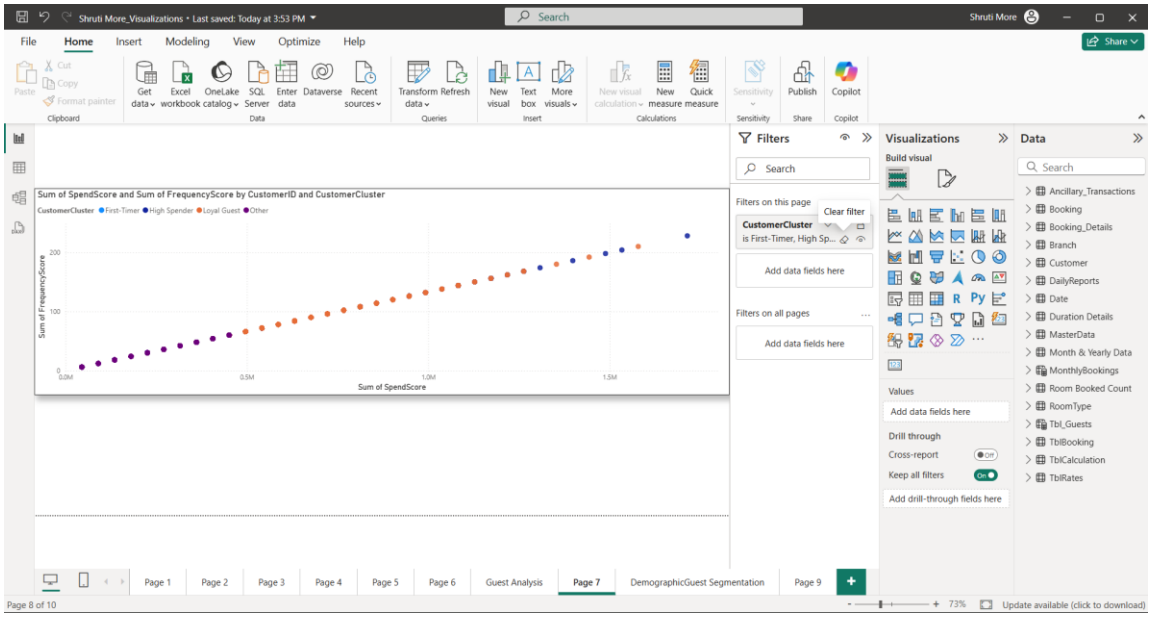


g) Geographic Distribution of First-Time Customers

A map visualization highlights the locations of first-time guests around the world.
This helps identify potential markets for targeted hotel promotions.

h) Customer Count by Guest Type and Source Type

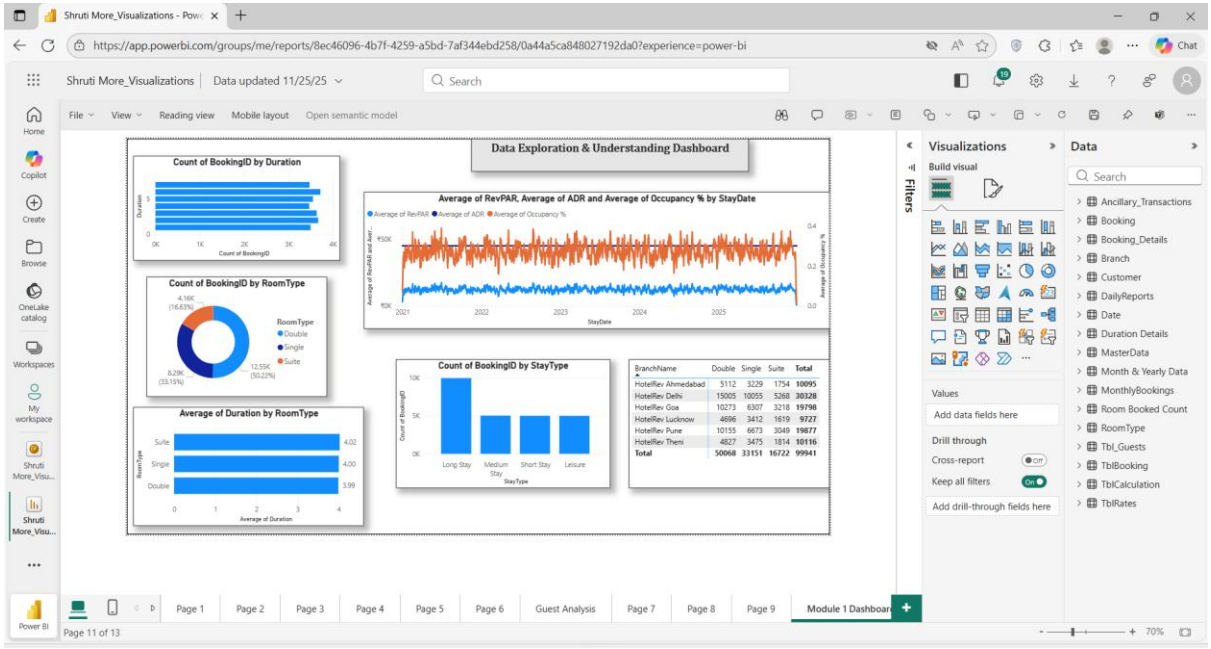
A horizontal bar chart compares how many customers (Direct vs OTA) belong to each guest category.
This helps understand channel preference for different customer groups.

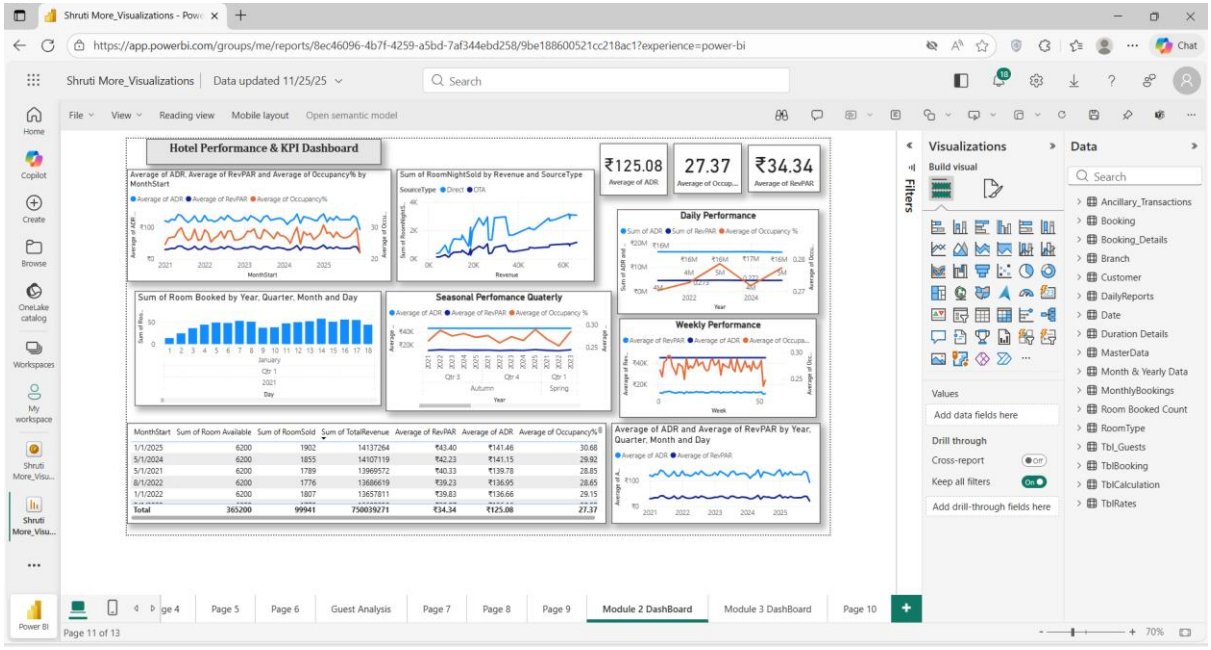


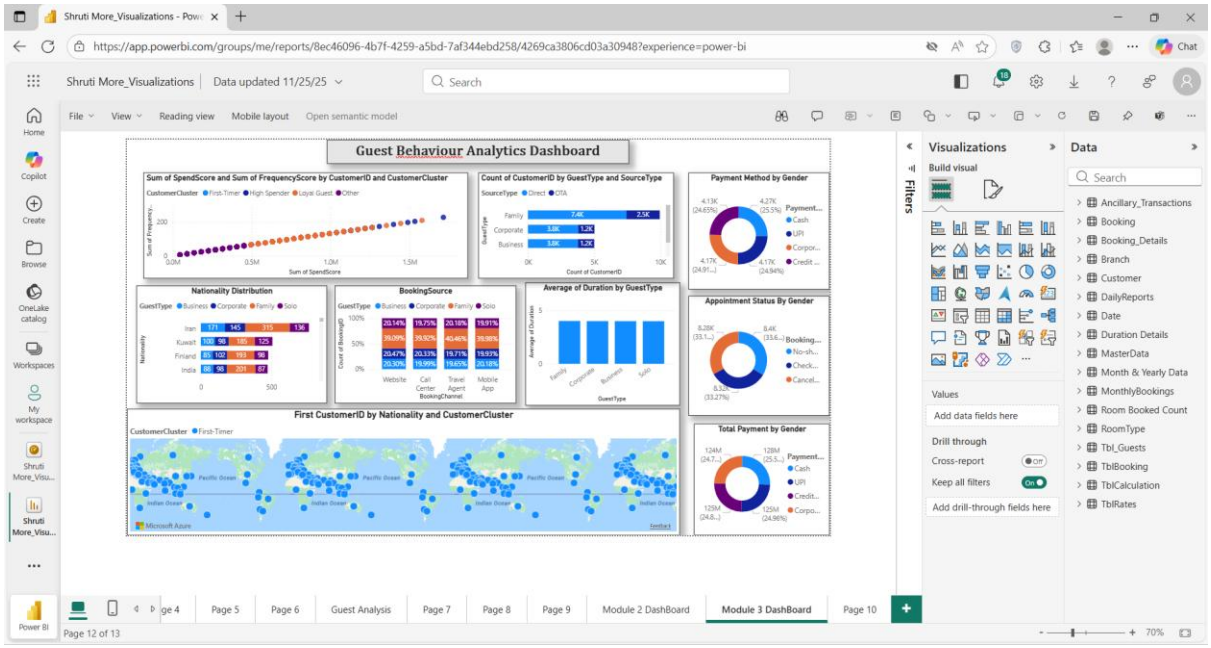
I)Spend Score vs Frequency Score (Scatter Plot)

This scatter plot compares customers based on how much they spend (SpendScore) and how often they visit (FrequencyScore). Each dot represents a customer and colors indicate their CustomerCluster.

DASHBOARD







Insights and Learning from Module 3

1. Clear Customer Segmentation
Using calculated fields like GuestType and CustomerCluster, customers were grouped into Business, Family, Corporate, Solo, First-Timer, Loyal Guest, and High Spender. This helped understand each group's unique behavior.

2. Behaviour Patterns Identified
RFM scoring (Recency, Frequency, Spend) revealed how often customers visit, how recently they stayed, and how much revenue they contribute. This highlighted loyal vs. high-value customers.

3. Booking and Spending Trends
Visualizations showed differences in booking channels, payment methods, nationality distribution, and stay duration across guest types. These trends help identify which customer segments are most profitable.

4. Geographic Insights
Map visuals showed the spread of customers globally, helping identify strong markets and potential areas for growth.

5. Better Customer Understanding
By analysing segmentation, stay patterns, and RFM scores, the hotel can improve marketing, personalize service, and increase customer retention.

6. Strong Foundation for Predictive Analysis
The structured segmentation and scoring system prepares the data for deeper analysis like churn prediction and targeted promotions.

Conclusion

Module 3 successfully enhanced customer understanding by segmenting guests based on their behavior, booking patterns, and spending levels. Through analytical fields like GuestType, CustomerCluster, and

RFM scoring, we identified distinct customer groups and their preferences. The visualizations provided meaningful insights into nationality distribution, booking sources, stay duration, and payment trends.

Overall, this module helps the hotel make data-driven decisions, improve customer engagement, personalize services, and strengthen marketing strategies. It provides a solid foundation for targeting high-value customers, improving retention, and planning future business growth.