HSNC University, Mumbai – 400018

School of Applied Sciences

Research Project

as

“Online Travel Agency Dashboard”

Submitted in partial fulfilment of

S.Y. M.Sc. (Data Science & Business Analytics)

Submitted by

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Under the guidance of

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Department of

Data Science and Business Analytics

CERTIFICATE

Exam Seat No : SYMSDS2023004, SYMSDS2023009, SYMSDS2023012, SYMSDS2023016, SYMSDS2023021

This is to certify that we **Ms. Aditi Sharma, Ms. Aabha Modhave, Ms. Neetu Choudhary, Mr. Adnan Khan & Mr. Siddhesh Pednekar** have successfully completed the Research Project about **"Online Travel Agency Dashboard"** and duly submitted the project in partial fulfilment of the **"S.Y.M.Sc. (Data Science & Business Analytics)"** degree from the **HSNC University, Mumbai** during the **Academic Year 2024 – 25**. It is further certified that we all have completed all the required phases of the Project.

Internal Guide	External Guide	Head of Department	Vice Chancellor

DECLARATION BY THE STUDENT

We, Ms. Aditi Sharma, Ms. Aabha Modhave, Ms. Neetu Choudhary, Mr. Adnan Khan & Mr. Siddhesh Pednekar, students of M.Sc. Data Science and Business Analytics hereby declare that **"Online Travel Agency Dashboard"** is submitted by us for Semester – III during the academic year 2024-25. It is based on actual work carried out by us under the guidance and supervision of Prof. Anjali Suthar.

We further state that this work is original and not submitted anywhere else for any examination.

_____

Signature of all Students

EVALUATION CERTIFICATE

This is to certify that the undersigned have assessed and evaluated the project on "**Online Travel Agency Dashboard"** by **Ms. Aditi Sharma, Ms. Aabha Modhave, Ms. Neetu Choudhary, Mr. Adnan Khan & Mr. Siddhesh Pednekar** students of M.Sc. Data Science and Business Analytics. This Project is original to the best of our knowledge and has been accepted for Assessment.

External Examiner

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We are indebted to our project guide Prof. Anjali Suthar for her mentorship, expertise, and continuous encouragement for the successful completion of this project.

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Last but not least, we want to express our heartfelt appreciation to our families and classmates for their support, understanding, and encouragement throughout the journey. This project would not have been possible without their love and collective support.

With sincere regards,

Ms. Aditi Sharma, Ms. Aabha Modhave, Ms. Neetu Choudhary,

Mr. Adnan Khan & Mr. Siddhesh Pednekar

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ABSTRACT

This research project delves into the intricate dynamics and performance metrics of the online travel agency (OTA) market, a vital sector in the global tourism and hospitality industry. The OTA market has grown rapidly in recent years, driven by increased internet penetration, the rise of mobile technology, and the growing demand for convenient and comprehensive travel services. As OTAs become a primary avenue for travelers to book flights, hotels, and vacation packages, understanding the factors that drive consumer decisions and business success has become critical. This research uses a data-driven approach, leveraging PowerBI as a powerful visualization and analysis tool to unearth insights from the OTA market's complex dataset.

At the heart of this research is the examination of key performance indicators (KPIs) that are essential to understanding the performance of OTAs. KPIs such as booking trends, customer demographics, pricing strategies, and the regional distribution of flights and hotel bookings are the focus of this project. These indicators provide a comprehensive view of how OTAs are functioning and reveal the underlying patterns that drive consumer behavior. By identifying these patterns, OTAs can better understand the preferences and needs of their customers, enabling them to tailor their offerings to maximize customer satisfaction and business profitability.

Booking trends represent one of the most important metrics for OTAs. By analyzing the frequency and timing of flight and hotel bookings, this research identifies peak travel periods, regional demand fluctuations, and consumer preferences for different travel services. For instance, flight bookings often experience spikes during holiday seasons, while hotel bookings tend to rise during vacation periods or popular tourist events. These insights allow OTAs to optimize their inventory management, marketing strategies, and pricing models to align with consumer demand, helping them to capture a larger market share.

Another crucial aspect of this research is the examination of customer demographics. The OTA market serves a wide range of customers, each with unique preferences, budgets, and travel behaviors. By segmenting customers based on age, income, travel frequency, and other

demographic factors, this research provides a detailed understanding of how different customer groups interact with OTA platforms. For example, younger travelers (ages 18-35) tend to prioritize budget-friendly options and are more likely to book last-minute travel deals, while older travelers often prefer premium services and plan their trips well in advance. These demographic insights enable OTAs to design targeted marketing campaigns, personalized offers, and loyalty programs that cater to the specific needs of different customer segments.

Pricing is another vital KPI explored in this research. In the highly competitive OTA market, pricing strategies can make or break a business. This project analyzes how OTAs use dynamic pricing to adjust rates based on demand, seasonality, and competition. By examining pricing patterns, the research identifies the most effective discount and promotion strategies that attract customers, particularly price-sensitive travelers. For instance, offering limited-time discounts or early-bird deals can significantly boost bookings during off-peak seasons, helping OTAs maintain a steady revenue stream even when demand is low.

Additionally, the research looks at the regional distribution of flights and hotel bookings, providing valuable insights into geographic preferences and trends. Different regions may have varying preferences for domestic versus international travel, as well as distinct peak booking periods based on local holidays and events. By mapping out regional booking patterns, OTAs can allocate their resources more effectively, ensuring they have the right inventory in the right places at the right time. This regional analysis also helps OTAs identify emerging markets and growth opportunities, allowing them to expand their reach and increase their competitiveness on a global scale.

Through the use of PowerBI As a visualization tool, this research project translates complex datasets into intuitive and actionable insights. PowerBI allows for the creation of interactive dashboards that display KPIs in real-time, enabling businesses to monitor performance and make data-driven decisions. The visual nature of PowerBI also enhances the clarity of the findings, making it easier for stakeholders to understand key trends and take immediate action.

The findings from this research project are invaluable for businesses operating in the OTA market. By providing actionable insights into consumer behavior, market trends, and pricing dynamics, the project equips OTAs with the information they need to optimize their strategies. In a highly competitive market where customer preferences are constantly evolving, having access to real-time data and analysis tools like PowerBI gives OTAs a critical edge. With these insights, OTAs can enhance their customer engagement, improve user experiences, and ultimately boost their profitability and long-term success.

In conclusion, this research project not only highlights the importance of KPIs in understanding the OTA market but also demonstrates how data-driven analysis can lead to actionable insights that drive business success. By focusing on booking trends, customer demographics, pricing strategies, and regional distribution, the project provides a comprehensive view of the factors that influence OTA performance. The use of PowerBI as a visualization tool further amplifies the value of this research, enabling businesses to make informed decisions in real-time and stay ahead in the competitive OTA landscape.

INTRODUCTION

1.1 Background

The online travel agency (OTA) market has transformed the way consumers book flights, hotels, and vacation packages, fundamentally altering the travel industry's landscape. With the rise of internet connectivity and widespread adoption of mobile devices, OTAs have experienced rapid growth, offering travelers the convenience of booking their entire trip from the comfort of their home or while on the go. These platforms consolidate a broad range of travel options from various airlines, hotels, and other travel services into a single, unified interface. This aggregation allows consumers to easily search, compare, and book travel accommodations based on their preferences, such as price, amenities, or customer reviews.

One of the key advantages of OTAs is their ability to offer competitive pricing. By bringing together multiple service providers, OTAs create a marketplace where travelers can find the best deals and promotions, often in real time. This competition drives down prices and gives consumers access to a range of discounts and special offers that may not be available through direct bookings with airlines or hotels. Additionally, OTAs provide user-friendly interfaces designed for simplicity and efficiency, making the booking process more intuitive and accessible for all types of travelers, from business professionals to vacationers.

In summary, OTAs have revolutionized the travel industry by providing consumers with easy, efficient, and cost-effective ways to plan their trips, helping them navigate the complexities of modern travel with just a few clicks. This convenience, combined with competitive pricing and a seamless user experience, has solidified OTAs as a dominant force in the global travel market.

1.2 Objectives

The primary objective of this research is to gain a comprehensive understanding of consumer behavior in the online travel agency (OTA) market by leveraging data visualization tools, specifically PowerBI. By examining patterns in hotel and flight bookings, the research seeks to uncover key trends such as peak booking periods, popular destinations, and customer preferences. Additionally, the study aims to analyze the influence of regional preferences, pricing strategies, and booking windows on OTA performance, helping businesses identify the factors that drive customer decisions. Ultimately, the goal is to provide actionable insights that OTA businesses can use to refine their strategies, optimize pricing, enhance customer experiences, and improve overall decision-making processes to stay competitive in a dynamic market.

This research aims to:

- Understand the behavior of consumers in the OTA market through a data visualization approach.
- Identify key trends in hotel and flight bookings.
- Analyze the impact of regional preferences, pricing strategies, and booking windows on OTA performance.
- Provide actionable insights to improve decision-making for OTA businesses.

LITERATURE REVIEW

The evolution of online travel agencies (OTAs) has been a widely researched topic, with numerous studies examining the factors that contribute to their rapid growth and success in the global tourism market. Traditional methods of booking travel, such as using travel agents or booking directly with airlines and hotels, have steadily been replaced by OTAs due to their convenience, accessibility, and ability to offer competitive pricing. OTAs aggregate a vast array of travel options, making it easier for consumers to compare prices and services across multiple providers. However, the success of OTAs is influenced by several factors, such as pricing strategies, consumer trust, service quality, technological advancements, and effective marketing.

One of the foundational studies in this domain is by Xiang et al. (2015), which highlighted the critical role that search engine visibility and marketing strategies play in driving traffic to OTA platforms. Their research demonstrated that OTAs must invest in search engine optimization (SEO) and pay-per-click (PPC) advertising to remain competitive in a crowded marketplace. With the vast majority of consumers beginning their travel planning via search engines, ensuring high visibility is essential for OTAs to attract customers. This study also underscored the importance of user-friendly website designs and intuitive interfaces to improve conversion rates.

Another significant factor contributing to the success of OTAs is their pricing strategies. Many studies have shown that OTAs leverage dynamic pricing models to adjust their rates in real-time based on demand, seasonality, and competition. This enables them to offer competitive deals and discounts that attract price-sensitive customers. Research by Law et al. (2018) further elaborated on the role of mobile technologies in accelerating the growth of OTAs. The proliferation of smartphones and mobile apps has given rise to an "always-connected" consumer, enabling travelers to book flights, hotels, and vacation packages on the go. This has resulted in a sharp increase in last-minute bookings, with mobile platforms becoming a key sales channel for OTAs.

Building on these foundational studies, this research project incorporates a dashboard analysis approach to uncover real-time trends and provide actionable insights into OTA performance. While traditional research methods, such as surveys and interviews, have been instrumental in identifying consumer preferences and behavior, they often fall short in capturing the dynamic nature of the OTA market. By utilizing data visualization tools like PowerBI, this research presents a more nuanced and timely analysis of key performance indicators (KPIs) such as booking trends, customer demographics, pricing, and regional preferences. The real-time nature of this approach allows for more precise identification of emerging trends and patterns, enabling OTA businesses to respond quickly to changes in consumer behavior and market conditions.

The significance of this research lies in its ability to bridge the gap between traditional methods of studying OTAs and the more data-driven approaches that have become increasingly important in today's digital economy. Traditional methods, while useful for understanding broad consumer trends, often lack the precision needed for strategic decision-making in the highly competitive OTA market. By contrast, this research's use of a dashboard analysis offers OTAs the ability to monitor and analyze their performance in real-time, allowing for quicker and more informed decisions. For example, OTAs can use the dashboard to track fluctuations in booking volumes, identify which regions are experiencing increased demand, and adjust their marketing and pricing strategies accordingly.

However, despite the advantages of this data-driven approach, OTAs face several challenges. One of the primary challenges is the increasing competition within the market. As more players enter the OTA space, businesses must continuously innovate to differentiate themselves and retain customer loyalty. This is further complicated by the growing influence of meta-search engines like Google Flights and Kayak, which aggregate listings from multiple OTAs, allowing consumers to bypass individual platforms altogether. OTAs must also contend with the challenge of maintaining consumer trust, particularly regarding data privacy and security. As consumers become more aware of the risks associated with online transactions, OTAs need to invest in robust cybersecurity measures to protect their customers' personal and financial information.

Another challenge lies in consumer behavior itself. While OTAs provide a wealth of options and flexibility, they must also navigate the complexity of consumer decision-making processes, which are influenced by factors such as brand loyalty, price sensitivity, and service expectations. Research has shown that while price is a major factor for many consumers, other elements such as ease of booking, customer service, and post-purchase support also play crucial roles in shaping consumer satisfaction and repeat business.

In terms of implications, this research highlights the importance of adopting a data-driven approach to understanding and navigating the OTA market. The insights derived from this research can help OTA businesses refine their pricing strategies, optimize their marketing campaigns, and enhance customer experiences. For instance, by identifying regional preferences for flights or hotels, OTAs can tailor their offerings to meet the specific needs of different markets. Additionally, understanding booking windows (the time between booking and the actual travel date) can help OTAs adjust their inventory and promotional strategies to maximize revenue.

In conclusion, while traditional research methods have provided valuable insights into the OTA market, the increasing complexity and competitiveness of the industry require more sophisticated approaches. This research project builds on the existing literature by incorporating real-time data visualization through PowerBI, offering OTAs the tools they need to make informed, data-driven decisions. By understanding consumer behavior, pricing strategies, and regional preferences, OTAs can optimize their operations and stay competitive in an ever-evolving market. Future research could further explore the integration of machine learning algorithms to enhance predictive capabilities in OTA performance analysis.

METHODOLOGY

The methodology for this research project involves a data visualization approach using PowerBI, with the primary objective of analyzing the performance and key dynamics within the online travel agency (OTA) market. The study employs a secondary dataset sourced from Kaggle, which contains comprehensive booking data across different categories, including orders, hotels, flights, and insurances. This dataset serves as the foundation for the development of an interactive dashboard designed to uncover key performance indicators (KPIs) such as booking trends, pricing, customer demographics, and regional distribution. By utilizing this dataset, we aim to derive actionable insights into the behavior of OTA consumers and market trends, helping businesses optimize their strategies.

Data Collection

The dataset used in this study is publicly available on Kaggle and represents a wide range of booking records from a leading OTA. The data covers various categories such as flight and hotel bookings, travel insurance purchases, and related customer orders. The dataset includes crucial attributes like booking type, customer demographics, regional information, pricing data, and booking timestamps. These variables provide the necessary inputs to create meaningful visualizations in PowerBI and enable comprehensive analysis.

The selection of this dataset was based on its scope, depth, and relevance to the objectives of this research. The dataset contains multiple dimensions that reflect the core operational components of an OTA platform, which include:

- Orders: Detailed records of customer orders, including the type of booking (flight, hotel, or insurance).
- Hotels: Information on hotel bookings, including location, star rating, and room preferences.
- Flights: Data on flight bookings, including origin, destination, airline, and class of travel.
- Insurance: Travel insurance data indicating the customer preferences for optional add-ons and protections.

Data Processing and Transformation

Before analysis, the dataset underwent a preprocessing phase to ensure data quality and consistency. This involved cleaning and filtering the data to remove any null values, duplicate entries, or inconsistencies. Data was then categorized into appropriate groups, such as booking types (flights, hotels, or insurance) and customer demographics (age, income, and region). This was followed by aggregating data for each of the KPIs identified, including booking volume, revenue, customer ratings, and regional performance.

A significant aspect of this research involved structuring the data into tables and relationships that could be used effectively in PowerBI's data model. The relationships between flight bookings, hotel stays, and other customer purchases were carefully mapped to allow for cross-referencing and comparison across different dimensions. This enabled the creation of complex queries and interactive elements in the dashboard, which formed the basis of the analysis.

Dashboard Design and Key Dimensions

The interactive dashboard developed in PowerBI offers a user-friendly interface through which stakeholders can explore the OTA market data and drill down into specific insights. Key dimensions analyzed within the dashboard include:

1. Booking Types: This dimension categorizes data into flights, hotels, and travel insurance. The dashboard provides an overview of the proportion of each booking type and compares performance metrics such as revenue and booking volume across these categories. Users can filter by type to explore detailed insights for each segment.
2. Regional Distribution: The dashboard allows for the geographic analysis of bookings, showing how demand varies across different regions. This helps identify the most popular destinations and highlight regions where the OTA is underperforming. The regional distribution analysis also provides insights into market penetration and the effectiveness of marketing strategies in specific areas.
3. Customer Demographics: The demographic analysis focuses on factors such as age, income level, and travel preferences. This dimension is crucial for understanding the customer base and tailoring marketing strategies. The dashboard visualizes trends in

customer behavior, such as which age groups book the most frequently or spend the most on travel, helping businesses to segment and target their audience more effectively.

4. Pricing Analysis: The dashboard includes detailed pricing analysis, covering average prices per booking, discounts applied, and seasonal price variations. It highlights patterns such as how prices fluctuate during peak travel periods or in response to market conditions. This helps businesses optimize their pricing strategies to remain competitive while maximizing revenue.
5. Time Series Analysis: Time series analysis tracks booking trends over time, identifying high-traffic periods, seasonal spikes, and booking lead times (the gap between booking and travel dates). This provides insights into customer planning behavior and enables OTAs to better predict demand, adjust inventory, and offer targeted promotions.

Key Performance Indicators (KPIs)

The PowerBI dashboard focuses on several KPIs that are essential for understanding OTA market dynamics:

- Booking Volume: The total number of bookings over specific periods, broken down by category (flights, hotels, insurance) and region.
- Revenue: Total revenue generated by bookings, with the ability to drill down by booking type, region, and customer demographic.
- Customer Satisfaction Ratings: A measure of customer satisfaction based on feedback or ratings from previous bookings. This KPI is essential for understanding customer loyalty and identifying areas for service improvement.
- Market Segmentation: Insights into the distribution of different customer segments, such as budget-conscious travelers versus luxury seekers, based on booking preferences and spending behavior.

Data Analysis Tools

PowerBI was chosen for its robust data visualization capabilities and interactive features, which allow users to explore the data from multiple angles. It enables dynamic filtering and cross-referencing of variables, providing a comprehensive understanding of the OTA market. PowerBI's visualizations, including bar charts, line graphs, and geographic heat maps, help to present complex data in an accessible way for stakeholders.

The methodology employed in this research leverages secondary data from a comprehensive OTA dataset to uncover trends and patterns within the market. By using PowerBI to create an interactive dashboard, the research offers actionable insights into customer behavior, regional performance, pricing, and booking trends, all of which are crucial for OTAs to make informed decisions in a competitive market. The flexibility of PowerBI's tools allows for ongoing exploration of data as market conditions evolve, ensuring that businesses can remain agile in response to changes in consumer behavior.

ANALYSIS

The PowerBI dashboard highlights several key findings:

- Booking Trends: Flights account for the highest number of bookings, with noticeable spikes during holiday seasons and regional festivals. Hotel bookings tend to rise during peak tourist seasons, especially in popular destinations.
- Regional Preferences: Certain regions show a higher preference for domestic flights, while others favor international travel. Major cities like New York, London, and Tokyo are consistently top destinations.
- Customer Segmentation: Younger consumers (aged 18-35) prefer budget travel options, while older age groups opt for premium services. Family bookings show a preference for package deals combining flights and hotels.
- Price Sensitivity: Discounts and promotions significantly influence booking decisions, especially during off-peak seasons.

Let's understand them in detail:

The analysis conducted through the PowerBI dashboard sheds light on critical trends and patterns in the online travel agency (OTA) market. By visualizing booking data related to flights, hotels, and customer behaviors, several key insights emerge, which are instrumental for businesses in optimizing their strategies. The analysis focuses on four main areas: booking trends, regional preferences, customer segmentation, and price sensitivity.

Booking Trends

The analysis reveals that flight bookings account for the majority of total bookings on the platform, indicating that flights are the most sought-after travel service among consumers. The data further highlights noticeable spikes in flight bookings during specific periods, particularly around holiday seasons such as Christmas, New Year, and national holidays. Additionally, regional festivals also show a significant impact on flight bookings, with events like Diwali in India or the Chinese New Year leading to increased travel demand.

Hotel bookings, on the other hand, display a more seasonal trend, with the highest demand observed during peak tourist seasons such as summer vacations and spring break. Notably, certain destinations that are popular tourist hubs, like coastal resorts or cultural cities, experience higher hotel bookings during these periods. The data indicates a strong correlation between the rise in hotel bookings and the proximity to major tourist attractions or natural landmarks. The findings suggest that OTAs can optimize their marketing strategies by targeting specific periods and promoting seasonal offers to capitalize on these booking spikes.

Regional Preferences

The geographic analysis highlights distinct regional preferences in travel behavior. Certain regions exhibit a stronger inclination toward domestic travel, with a high number of bookings for short-haul flights. For instance, in countries like the United States, there is a notable preference for domestic flights, with travelers booking flights between major cities such as New York, Los Angeles, and Chicago. Similarly, in Europe, there is a tendency to book flights within the Schengen area due to ease of travel and shorter travel times.

On the other hand, international travel is more common in other regions, especially for long-haul flights to global hubs like London, Tokyo, and Paris. The data suggests that cities like New York, London, and Tokyo consistently rank as top destinations, reflecting their status as business, cultural, and tourist hotspots. Additionally, international travelers often prefer premium flight services or package deals that combine flights and hotel bookings, indicating the potential for OTAs to offer tailored travel packages based on destination preferences.

Customer Segmentation

The customer segmentation analysis provides valuable insights into the travel preferences of different age groups. The data reveals that younger consumers, particularly those aged 18-35, are more inclined to book budget-friendly travel options. This demographic is price-sensitive and tends to prioritize discounts, promotions, and cost-effective travel solutions. For example, low-cost airlines and budget hotels are frequently booked by younger travelers, especially for leisure travel and weekend getaways.

In contrast, older age groups, particularly those aged 45 and above, tend to opt for premium services, such as business class flights and luxury hotels. This segment also shows a higher interest in curated travel experiences, such as guided tours and exclusive travel packages. Additionally, the data suggests that family bookings often focus on package deals that combine flights and hotels, catering to their need for convenience and value for money. Family travelers are more likely to book well in advance and prefer destinations that offer family-friendly amenities, such as resorts or theme parks.

Price Sensitivity

The pricing analysis reveals that price sensitivity plays a significant role in influencing booking decisions. Discounts, special offers, and promotions have a noticeable impact, particularly during off-peak seasons when travel demand is lower. The data shows that consumers are highly responsive to price drops, and booking volumes increase during promotional periods. Off-peak seasons, such as the months immediately following the holiday season or during midweek travel, see a higher uptake in bookings when discounts are applied.

Additionally, price-conscious travelers, particularly those in the younger demographic, actively seek out promotional deals and last-minute discounts. OTAs can leverage this insight by offering dynamic pricing models that adjust based on demand fluctuations, as well as targeted promotions during off-peak periods to boost bookings.

The analysis of booking trends, regional preferences, customer segmentation, and price sensitivity provides a comprehensive view of the OTA market's key dynamics. By utilizing this data-driven approach through the PowerBI dashboard, OTAs can fine-tune their strategies, develop more personalized marketing campaigns, and optimize pricing models to better align with customer preferences and regional demand. These insights are crucial for enhancing customer satisfaction, increasing booking volumes, and staying competitive in the highly dynamic OTA market.

RESULT

The dashboard reveals the following results:

- Flight bookings dominate the OTA market, but hotel bookings provide higher margins due to premium pricing.
- Customer loyalty is linked to regional preferences, with customers from urban areas more likely to book repeat trips.
- Seasonal variations strongly affect both flights and hotel bookings, with summer and winter holidays being peak seasons.
- Discount strategies and promotions are critical for attracting budget-conscious consumers and improving conversion rates.

Dashboard 1:

Booking Trends

- Flight Orders: There have been 499 flight bookings, indicating strong demand for flights on the platform.
- One-Way Flights: Of these, 62 are one-way flights, which suggests that a significant number of travelers may be booking single-leg journeys, likely for business trips or short stays.
- Round-Trip Flights: With 437 round-trip flights, it is clear that most users prefer round trips, possibly for vacations, business, or family visits, which shows that the platform caters to various traveler needs.

Hotel Orders

- 740 Hotel Orders: The platform has a high volume of hotel bookings, which exceeds the number of flight orders, suggesting that customers may be more inclined to use the OTA for accommodation. This could imply either standalone hotel bookings or package deals that combine flights and hotel stays.

Popular Destination

Paris - Most Popular Destination: Paris stands out as the most popular destination. This insight highlights that Paris is a highly desirable location for travelers, whether for business, leisure, or tourism. OTAs could focus marketing and promotion efforts on travel packages or deals to Paris to capitalize on this demand.

Destination Cities

11 Destination Cities: The dashboard indicates that the platform offers travel options to 11 different cities. Although the number of destination cities is relatively limited, these might be highly sought-after locations. Expanding the number of cities could help the OTA attract a broader customer base.

Insurance Orders

- 246 Insurance Orders: The platform also deals with insurance products, including travel-related insurance. This is significant, as it indicates that many travelers are opting for insurance to protect their bookings. The availability of travel insurance enhances the customer experience by offering peace of mind.
- Cancellation Insurance Orders (140): A considerable portion of travelers (140 orders) has opted for cancellation insurance. This reflects a concern among customers about the uncertainty of travel plans, which could be due to factors such as global health concerns, changing regulations, or personal reasons.
- Multi-Risk Insurance Orders (106): 106 travelers have opted for multi-risk insurance, which likely covers a range of issues, such as medical emergencies, lost luggage, or travel disruptions. This suggests that customers want comprehensive protection during their trips.

Key Insights

1. Seasonality and Promotions: Given the notable number of flight and hotel orders, seasonality might play a role, especially since flights see spikes during holidays and major events. Targeted promotions during high-traffic periods (e.g., holiday seasons) could boost bookings further.

2. Travel Preferences: Paris as the top destination signals a strong preference for popular tourist or business hubs. Expanding the offerings to include more cities or partnering with local travel services in Paris could attract even more customers.
3. Insurance Uptake: The significant uptake of cancellation and multi-risk insurance suggests an opportunity for the OTA to bundle insurance with flight and hotel bookings as a value-added service. This could enhance customer trust and satisfaction.
4. Customer Segmentation: The number of flight and hotel orders, combined with the data on one-way vs. round-trip flights, points to a diverse range of customer preferences, likely encompassing both budget-conscious and premium travelers.

Dashboard 2:

Dashboard Overview:

- **Navigation:** The top row includes navigation buttons for "Main Page," "Travel Map," "Sales Analysis," "Revenue Analysis," "Key Influencers," and "Self-Service."
- **Regions:** The dashboard offers a filter for selecting different regions: "All Regions," "North America," "Europe," and "MENA."
- **Metrics:** The dashboard displays three key metrics:
    - **Flight Orders:** 499
    - **Hotel Orders:** 740
    - **Insurance Orders:** 246

Insights:

- **Most Popular Region:** The dashboard doesn't provide specific information about the most popular region. However, the filter for regions suggests that the dashboard can be used to analyze performance across different geographic areas.
- **Order Volume:** The dashboard shows the total number of flight, hotel, and insurance orders. This information can be used to assess overall business activity and identify trends.
- **Order Distribution:** The dashboard doesn't provide a breakdown of orders by region or other categories. This information would be helpful to understand the geographic distribution of business and identify areas with higher demand.

Additional Considerations:

- **Travel Map:** The "Travel Map" button suggests that the dashboard may include a visual representation of travel data, such as popular destinations or travel routes. However, the provided image doesn't show this component.
- **Sales and Revenue Analysis:** The "Sales Analysis" and "Revenue Analysis" buttons indicate that the dashboard may include more detailed information about sales performance and revenue generation. However, the provided image doesn't show any specific data related to these areas.
- **Key Influencers:** The "Key Influencers" button suggests that the dashboard may identify important factors that influence travel bookings. However, the provided image doesn't show any specific information about these influencers.

Dashboard 3:

Dashboard Overview:

- **Navigation:** The top row includes navigation buttons for "Main Page," "Travel Map," "Sales Analysis," "Revenue Analysis," "Key Influencers," and "Self-Service."
- **Tabs:** The dashboard is divided into three tabs: "Flight Orders," "Hotel Orders," and "Flight + Hotel Orders."
- **Metrics:** The dashboard displays various metrics related to flight and hotel orders, including:
    - **Orders Partitioned by Insurance Type:** A pie chart showing the distribution of orders based on different insurance types (Cancellation, Multi-Risk, No Insurance).
    - **Order Count by Hour of Day:** A radar chart showing the number of orders received at different times of the day.
    - **Total Orders by Month:** A line chart showing the total number of orders received each month.

Insights:

- **Insurance Type:** The "Orders Partitioned by Insurance Type" chart indicates that the majority of orders are for "No Insurance" (70.38%), followed by "Multi-Risk" (19.62%) and "Cancellation" (10%). This information can be used to assess the demand for different insurance options.

- **Peak Order Times:** The "Order Count by Hour of Day" chart shows that the peak time for orders is between 11:00 PM and 12:00 AM, with a secondary peak between 6:00 PM and 7:00 PM. This information can be used to optimize staffing and resource allocation.
- **Seasonal Trends:** The "Total Orders by Month" chart shows that there is a seasonal pattern in order volume, with higher numbers of orders during peak travel seasons (e.g., summer). This information can be used to anticipate demand and plan accordingly.

Additional Considerations:

- **Travel Map:** The "Travel Map" button suggests that the dashboard may include a visual representation of travel data, such as popular destinations or travel routes. However, the provided image doesn't show this component.
- **Sales and Revenue Analysis:** The "Sales Analysis" and "Revenue Analysis" buttons indicate that the dashboard may include more detailed information about sales performance and revenue generation. However, the provided image doesn't show any specific data related to these areas.
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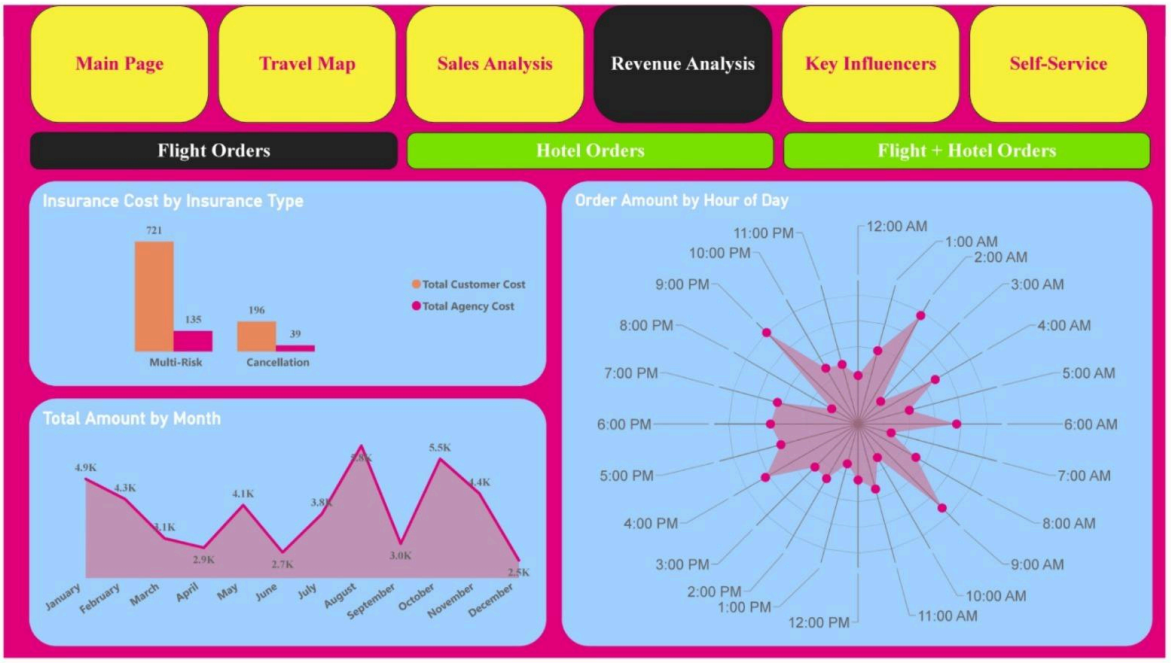
Dashboard 4:



Dashboard Overview:

- **Navigation:** The top row includes navigation buttons for "Main Page," "Travel Map," "Sales Analysis," "Revenue Analysis," "Key Influencers," and "Self-Service."
- **Tabs:** The dashboard is divided into three tabs: "Flight Orders," "Hotel Orders," and "Flight + Hotel Orders."
- **Metrics:** The dashboard displays various metrics related to flight and hotel orders, including:
    - **Insurance Cost by Insurance Type:** A pie chart showing the distribution of insurance costs based on different insurance types (Multi-Risk, Cancellation).
    - **Order Amount by Hour of Day:** A radar chart showing the average order amount at different times of the day.
    - **Total Amount by Month:** A line chart showing the total revenue generated each month.

Insights:

- **Insurance Cost:** The "Insurance Cost by Insurance Type" chart indicates that "Multi-Risk" insurance policies have a higher average cost than "Cancellation" policies. This information can be used to assess the profitability of different insurance products.

- **Peak Order Value:** The "Order Amount by Hour of Day" chart shows that the average order amount is highest between 11:00 PM and 12:00 AM and between 1:00 AM and 2:00 AM. This information can be used to identify the most valuable customer segments.
- **Seasonal Trends:** The "Total Amount by Month" chart shows a seasonal pattern in revenue generation, with higher revenue during peak travel seasons. This information can be used to anticipate demand and optimize pricing strategies.

Additional Considerations:

- **Travel Map:** The "Travel Map" button suggests that the dashboard may include a visual representation of travel data, such as popular destinations or travel routes. However, the provided image doesn't show this component.
- **Sales and Revenue Analysis:** The "Sales Analysis" and "Revenue Analysis" buttons indicate that the dashboard may include more detailed information about sales performance and revenue generation. However, the provided image doesn't show any specific data related to these areas.
- **Key Influencers:** The "Key Influencers" button suggests that the dashboard may identify important factors that influence travel bookings. However, the provided image doesn't show any specific information about these influencers.

Dashboard 5:

Dashboard Overview:

- **Navigation:** The top row includes navigation buttons for "Main Page," "Travel Map," "Sales Analysis," "Revenue Analysis," "Key Influencers," and "Self-Service."
- **Tabs:** The dashboard is divided into two tabs: "Insurance" and "Flights."
- **Key Influencers:** The "Key Influencers" section focuses on identifying factors that influence the likelihood of people purchasing travel insurance.

Insights:

- **Impact of Total Customer Cost:** The dashboard shows that as the total customer cost increases, the likelihood of people being insured also increases. The specific impact is quantified as a 5.00x increase in the likelihood of being insured when the total customer cost goes up by 5.28. This suggests that higher-priced travel packages may be more likely to include insurance.

Additional Considerations:

- **Other Influencers:** The dashboard doesn't provide information about other factors that may influence the likelihood of people purchasing travel insurance. These factors could include factors such as destination risk, traveler demographics, and marketing efforts.

- **Data Visualization:** The dashboard uses a simple bar chart to visualize the relationship between total customer cost and the likelihood of being insured. While this visualization is effective, it could be enhanced by adding more detailed information or using other visualization techniques.

Dashboard 6:

Quarter	Month	Day	Total Orders	Total Amount	Insurance Cost	Agency Cost
Qtr 1	January	1	1	97.22	7.75	1.84
Qtr 1	January	2	1	220.90	0.00	0.00
Qtr 1	January	4	1	375.83	27.30	4.29
Qtr 1	January	5	4	900.75	22.02	3.63
Qtr 1	January	7	1	159.77	0.00	0.00
Qtr 1	January	10	1	158.38	0.00	0.00
Qtr 1	January	13	1	170.59	0.00	0.00
Qtr 1	January	14	1	362.92	0.00	0.00
Qtr 1	January	16	1	213.28	0.00	0.00
Qtr 1	January	17	1	131.85	0.00	0.00
Qtr 1	January	18	1	186.47	0.00	0.00
Qtr 1	January	20	3	513.26	30.01	5.50
Qtr 1	January	21	1	38.46	0.00	0.00

Dashboard Overview:

- **Navigation:** The top row includes navigation buttons for "Main Page," "Travel Map," "Sales Analysis," "Revenue Analysis," "Key Influencers," and "Self-Service."
- **Filters:** The dashboard includes filters for "Order Type," "Quarter," "Month," "Day," "Insurance Type," "Flight Type," and "Host City."
- **Metrics:** The dashboard displays various metrics related to flight and insurance orders, including:
    - **Total Orders:** The total number of orders for each day.
    - **Total Amount:** The total revenue generated by orders for each day.
    - **Insurance Cost:** The total insurance cost for each day.
    - **Agency Cost:** The total agency cost for each day.

Insights:

- **Order Volume:** The dashboard shows that the highest number of orders occurred on January 20th, with a total of 3 orders. The lowest number of orders occurred on most days of the month, with only 1 order each.
- **Revenue:** The dashboard shows that the highest revenue was generated on January 4th, with a total of 900.75. The lowest revenue was generated on January 21st, with a total of 38.46.

- **Insurance Costs:** The dashboard shows that insurance costs vary significantly from day to day. The highest insurance cost was incurred on January 4th, with a total of 27.30. On most days, insurance costs were zero.
- **Agency Costs:** Agency costs also vary, with the highest cost incurred on January 4th (4.29) and the lowest cost on most days (0.00).

Additional Considerations:

- **Filters:** The filters allow users to explore the data at different levels of granularity, such as by quarter, month, day, or order type.
- **Missing Data:** The dashboard doesn't provide information for all days of the month, which may limit the insights that can be drawn.
- **Visualizations:** The dashboard could be enhanced by adding more visualizations, such as charts or graphs, to make the data more easily understandable.

FUTURE WORK & CONCLUSION

Future Research Directions:

Future research could delve deeper into the complexities of online travel agency (OTA) booking patterns by expanding the scope of analysis. Incorporating reviews and customer satisfaction scores would provide valuable insights into the quality of service and overall customer experience. Additionally, integrating social media sentiment analysis would offer a broader understanding of consumer preferences and perceptions.

By enhancing predictive analytics using machine learning models, researchers could forecast future booking trends with greater accuracy. This would enable OTAs to anticipate demand, optimize pricing strategies, and allocate resources more effectively. Furthermore, investigating the impact of global events, such as pandemics or economic crises, on OTA booking patterns would provide valuable insights into the resilience and adaptability of the travel industry.

These research directions would contribute to a more comprehensive understanding of OTA booking behavior and equip industry stakeholders with the knowledge needed to navigate future challenges and opportunities.

Conclusion:

Enhancing OTA Market Understanding through Data Visualization

This project offers a valuable contribution to the understanding of the online travel agency (OTA) market by employing a data visualization approach. The analysis reveals that customer preferences are not uniform but are significantly influenced by regional factors, age demographics, and pricing strategies. These findings underscore the importance of tailoring marketing efforts and pricing models to specific customer segments.

By visualizing the data, the project provides a clear and intuitive representation of complex trends and patterns. This enables stakeholders to quickly identify key insights and make informed decisions. For example, OTAs can use the dashboard to pinpoint regions with high

demand for particular types of travel packages or to analyze the impact of different pricing strategies on customer behavior.

Leveraging such data-driven dashboards empowers OTAs to optimize their offerings and enhance customer satisfaction. By understanding customer preferences and tailoring their services accordingly, OTAs can differentiate themselves from competitors and build stronger relationships with their customers. Moreover, the ability to make data-driven decisions can help OTAs identify new opportunities and mitigate risks in a rapidly evolving market.

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