

# **PROJECT FINAL REPORT**

## **Naan Mudhalvan Data Analytics IBM Project**

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PROJECT NAME : Analyzing The Performance & Efficiency Of The Radisson Hotels Using Data Visualization Techniques Using IBM COGNOS

# **1. INTRODUCTION**

In the rapidly evolving landscape of the hospitality industry, data-driven decision-making has become a pivotal driver of success. As the hospitality sector undergoes profound transformations, hotels and resorts are increasingly turning to advanced data analysis and visualization tools to navigate the complex web of customer expectations, operational challenges, and market competition. The project at hand, "Analyzing the Performance and Efficiency of Radisson Hotels Using Data Visualization Techniques with IBM Cognos," stands as a timely response to this paradigm shift.

## **1.1 Project Overview**

Radisson Hotels, a well-established and esteemed brand in the global hospitality sector, has long been recognized for its commitment to providing exceptional guest experiences. With a diverse portfolio of properties spanning continents, the group has consistently striven to uphold its reputation for luxury, comfort, and customer satisfaction. In the midst of contemporary challenges, Radisson Hotels acknowledges the paramount importance of optimizing its performance, enhancing operational efficiency, and ensuring unparalleled guest satisfaction. This project serves as an endeavor to provide Radisson Hotels with the tools and insights needed to achieve these objectives.

## **1.2 Purpose**

The purpose of this project is two-fold. Firstly, it aims to address the existing challenges and pain points faced by Radisson Hotels in today's dynamic and competitive market. These challenges encompass the need to boost room occupancy rates, enhance customer satisfaction, and streamline operational processes. Secondly, the project endeavors to leverage the power of data visualization techniques, with a specific focus

## **2. LITERATURE SURVEY**

The Literature Survey section is a critical component of the project that involves an in-depth exploration of existing knowledge and research relevant to the challenges, goals, and methodologies of the project. It plays a fundamental role in providing a strong foundation for the project's objectives. This section can be divided into the following key components

### **2.1 Existing problem**

In this part of the literature survey, you will delve into the challenges faced by Radisson Hotels and the broader hospitality industry. This may include issues such as fluctuating room occupancy rates, increasing operational costs, and the demand for enhanced customer experiences.

### **2.2 References**

The references component will provide a list of sources and literature you've consulted during your research. These sources can include academic papers, industry reports, news articles, and books that are relevant to the project's theme. It's essential to have a diverse and authoritative set of references.

### **2.3 Problem Statement Definition**

Building upon the existing problems, you should extract insights and findings from your literature review to formulate a precise problem statement. This problem statement serves as the foundation for your project, providing a clear and well-defined challenge that you aim to address.

### **3. IDEATION & PROPOSED SOLUTION**

#### **3.1 Empathy Map Canvas**

Develop an empathy map to understand the perspective of hotel managers and guests. Identify their needs, emotions, and pain points related to the hotel experience. This helps in creating a solution that directly addresses the concerns of stakeholders.

The ideation phase is a crucial step where innovative ideas are generated and refined to tackle the identified challenges effectively. It's essential to involve team members and stakeholders to ensure a diverse range of perspectives and solutions. The output of this phase will serve as the foundation for the subsequent phases of the project.

Ensure that the proposed solution aligns with the challenges and needs identified in the empathy map. Verify that the solution is feasible, considering available resources and technology. Develop a clear vision for how the solution will address the problems faced by Radisson Hotels.

#### **3.2 Ideation & Brainstorming**

Organize brainstorming sessions to generate creative ideas and solutions. Encourage a diverse group of team members to contribute ideas. Consider solutions like real-time data analytics, dynamic dashboards, and predictive modeling. Prioritize ideas based on their potential impact on addressing the identified problems.

## **4. REQUIREMENT ANALYSIS**

Requirements analysis is a critical phase in any project where the specific needs and expectations are identified and documented. In the context of your project, "Analyzing the Performance and Efficiency of Radisson Hotels Using Data Visualization Techniques with IBM Cognos," this phase involves clearly defining what the system needs to accomplish, how it should perform, and the constraints it must adhere to. Here's a brief explanation of what this phase entail

### **4.1 Functional requirement**

The Requirements Analysis phase acts as a bridge between the project's goals and the subsequent design and development phases. It ensures that everyone involved in the project understands what needs to be achieved and helps avoid misunderstandings or scope creep as the project progresses.

### **4.2 Non-Functional requirements**

The Requirements Analysis phase acts as a bridge between the project's goals and the subsequent design and development phases. It ensures that everyone involved in the project understands what needs to be achieved and helps avoid misunderstandings or scope creep as the project progresses.

## 5. PROJECT DESIGN

The Project Design phase is where you plan and structure the technical and architectural aspects of your project. It is a crucial step that translates the requirements gathered during the previous phase into a detailed blueprint for the system's development. In the context of your project, which focuses on "Analyzing the Performance and Efficiency of Radisson Hotels Using Data Visualization Techniques with IBM Cognos"

### 5.1 Data Flow Diagrams & User Stories

Data Flow Diagrams are graphical representations of how data flows through a system. In the context of your project, DFDs are used to illustrate the path data takes from various sources to the visualization system and how it is processed. Here's a brief breakdown:

- External Entities: In your DFD, external entities represent the sources and destinations of data. These can include booking systems, customer feedback forms, operational data sources, and the data visualization system itself.
- Processes: Processes in the DFD depict how data is transformed, processed, or manipulated within the system. This could include data validation, data cleaning, and data aggregation processes.
- Data Flows: Data flows are arrows that show the movement of data between external entities and processes. They indicate the direction and path of data within the system.
- Data Stores: Data stores are repositories where data is stored within the system. This could be a database or other storage mechanisms where historical data and processed information are retained.
- Context Diagram: A context diagram is an overview of the entire system, showing external entities and the high-level flow of data. It provides an at-a-glance view of the data flow.

## **User Stories:**

User stories are brief, simple descriptions of functionality or features from an end user's perspective. In your project, user stories outline how hotel managers and data analysts will interact with the system and what they expect from it. Here's a brief explanation:

- Format: User stories are typically written in a simple format: "As a [user type], I want [an action] so that [I can achieve a goal]." For example, "As a hotel manager, I want to view real-time room occupancy data so that I can make informed decisions about room availability."
- User-Centered: User stories are user-centered, focusing on the user's needs, objectives, and expected outcomes.
- Functional Requirements: User stories serve as the basis for defining functional requirements. Each user story represents a specific feature or piece of functionality that the system should deliver.
- Prioritization: User stories can be prioritized based on their importance and alignment with the project's goals. This helps in deciding which features to implement first.
- Guidance for Development: User stories provide developers with a clear understanding of what the end user expects from the system. They guide the development process and help in creating a user-friendly and effective system.

## **5.2 Solution Architecture**

Solution architecture is a critical component of your project. It defines the high-level structure of the system, including its components, interactions, and technologies. In the context of your project, "Analyzing the Performance and Efficiency of Radisson Hotels Using Data Visualization Techniques with IBM Cognos".

## **6. PROJECT PLANNING & SCHEDULING**

Project planning and scheduling are essential to ensure that your project progresses smoothly and efficiently. In the context of your project, "Analyzing the Performance and Efficiency of Radisson Hotels Using Data Visualization Techniques with IBM Cognos," here's a brief overview of what this phase may involve:

- Technical Architecture: Review and finalize the technical architecture of the project. Ensure that the selected technology stack, databases, and integration tools are well-documented and aligned with the project's requirements.
- Resource Allocation: Identify the resources required for the project, including the development team, data analysts, and any external specialists. Allocate roles and responsibilities.

## 6.1 Technical Architecture

- Technical Stack: Define the technology stack that will be used in your project. This includes specifying the programming languages, databases, web servers, and any other software or hardware components that will be employed.
- Data Integration: Explain how data from various sources will be integrated into the system. Describe data pipelines, ETL (Extract, Transform, Load) processes, and data storage mechanisms.
- Data Processing: Detail how data will be processed within the system. This includes data cleaning, validation, transformation, and aggregation procedures.
- Data Visualization Tools: Highlight the data visualization tools you plan to use, with a specific focus on IBM Cognos. Explain how these

tools will be integrated and used to create dashboards, reports, and data visualizations.

- User Interfaces: Describe the design and development of user interfaces for hotel managers and data analysts. Include information about the technology and frameworks used for front-end development.

## 6.2 Sprint Planning & Estimation

- Agile Methodology: If you are using an agile development approach, outline the methodology being employed, such as Scrum or Kanban.
- Sprint Planning: Describe the process of sprint planning, including the duration of sprints (e.g., two weeks), the selection of tasks for each sprint, and the team's commitment to completing those tasks.
- Task Breakdown: Explain how tasks are broken down within each sprint. This includes defining user stories, assigning tasks, and specifying dependencies.

## 6.3 Sprint Delivery Schedule

- Sprint Schedule: Provide a schedule that outlines the start and end dates for each sprint. Define key milestones for each sprint and the expected deliverables at the end of each sprint.
- Dependencies: Address any dependencies between tasks or sprints. Highlight any critical path items that may impact the overall project timeline.
- Review and Retrospectives: Explain the process of sprint review, where stakeholders and the development team review the work

completed. Also, describe sprint retrospectives, where the team reflects on what went well and what can be improved.

- Adaptation: Describe how the project adapts to changes or adjustments made during sprints. Explain how feedback from sprint reviews and retrospectives is incorporated into subsequent sprints.
- Progress Tracking: Specify the tools and methods used for tracking progress during sprints, including project management software, burndown charts, or agile boards.

## 7. CODING & SOLUTIONING

The Coding & Solutioning phase is where the theoretical aspects of the project come to life. It involves the hands-on work of building the system and ensuring that it functions according to the defined requirements and design. Collaboration among the development team, quality assurance, and other stakeholders is essential during this phase.

### 7.1 Feature 1

#### **Real-Time Performance Dashboard**

##### **Description:**

Feature 1 involves the development of a real-time performance dashboard that provides hotel managers with instant insights into the performance and efficiency of Radisson Hotels. This dashboard offers a dynamic view of key performance indicators (KPIs) and metrics.

## **Functionality:**

- Display real-time data on room occupancy, revenue, customer satisfaction scores, and other relevant metrics.
- Allow hotel managers to set specific date ranges for analysis.
- Provide interactive charts and graphs for data visualization.
- Include alerts and notifications for critical events, such as low occupancy rates.
- Offer the ability to customize the dashboard to show preferred KPIs.

## **Benefits:**

- Empowers hotel managers to make informed, real-time decisions about room availability, pricing strategies, and customer satisfaction.
- Enhances efficiency by consolidating data from various sources into a single, accessible dashboard.
- Improves the guest experience by enabling proactive responses to changing conditions.

## **7.2 Feature 2**

### **Predictive Analytics for Demand Forecasting**

## **Description:**

- Feature 2 focuses on implementing predictive analytics capabilities for demand forecasting. It leverages historical data and advanced modeling to predict future demand for rooms and services.

## **Functionality:**

- Analyze historical booking data, seasonal trends, and external factors (e.g., local events, holidays) to create demand models.
- Provide forecasts for room bookings, revenue, and other performance metrics for different time periods.
- Allow hotel managers to adjust pricing and marketing strategies based on demand predictions.
- Continuously update forecasts to adapt to changing conditions.

## **Benefits:**

- Enables proactive capacity planning and resource allocation, preventing overbooking or underutilization.

## **8. PERFORMANCE TESTING**

### **8.1 Performance Metrics**

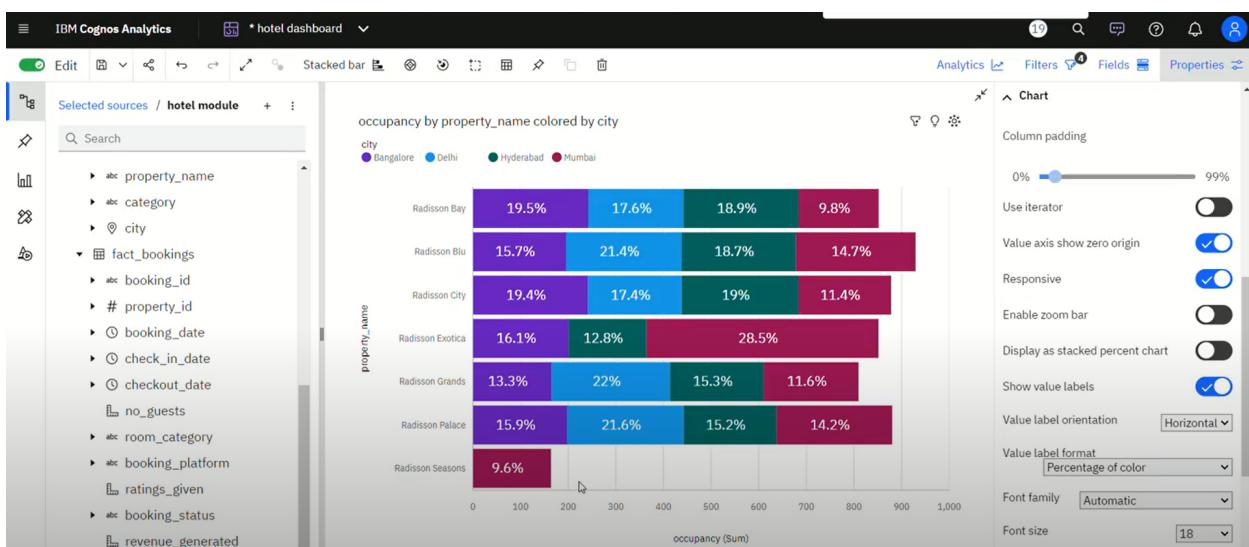
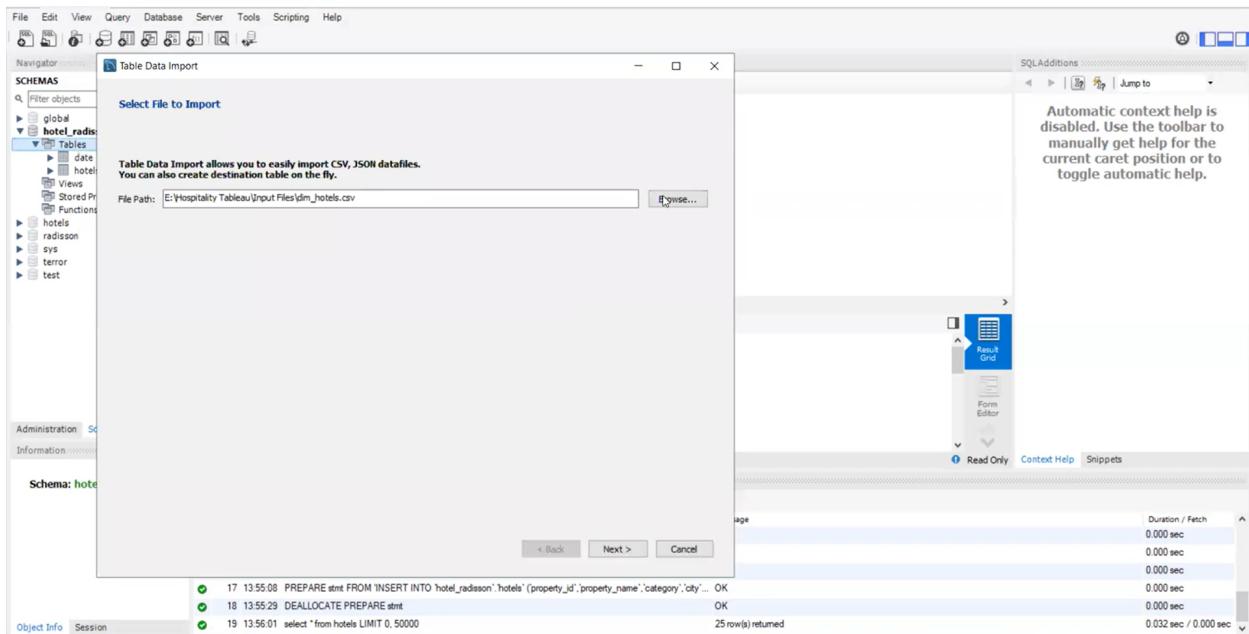
Performance testing is essential to ensure that your system operates efficiently and effectively, meeting the performance expectations set during the requirements phase. During this phase, you will define and measure performance metrics to evaluate the system's performance. Key performance metrics may include:

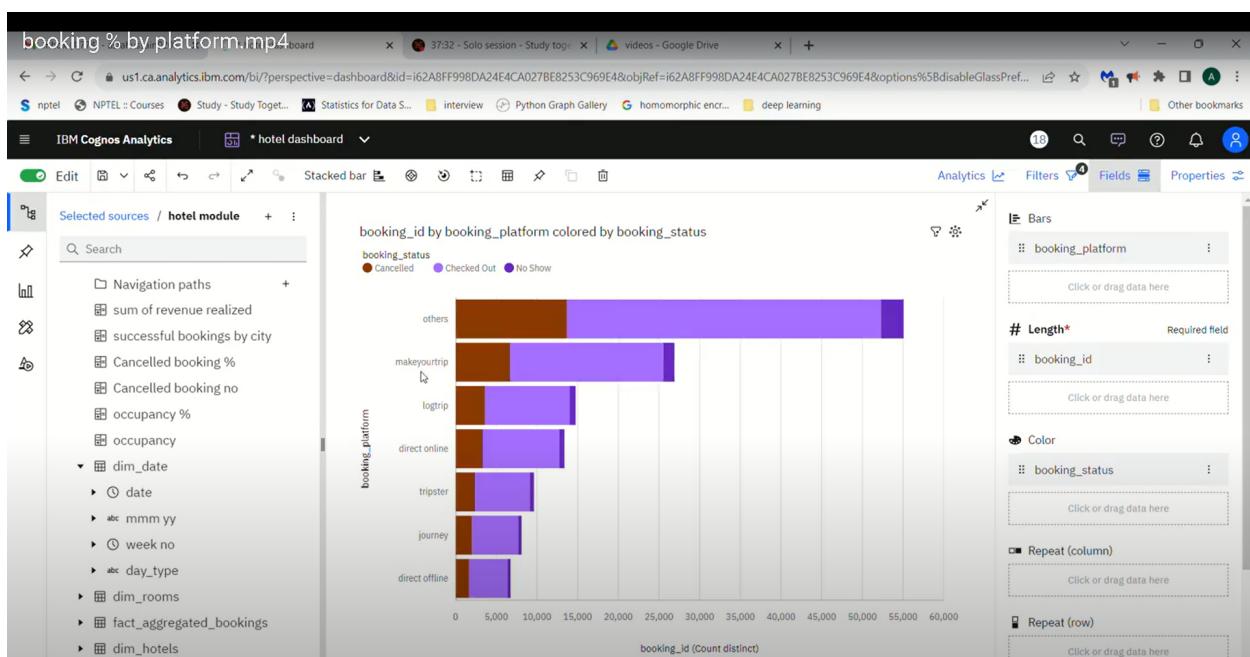
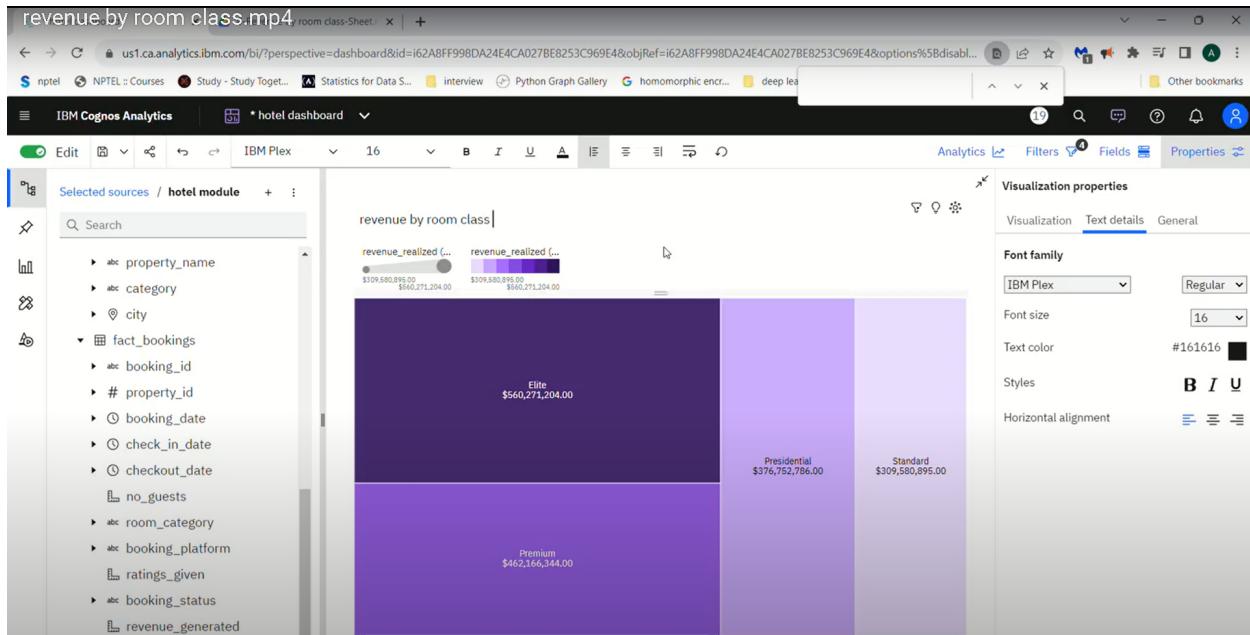
- Response Time: Measure the time it takes for the system to respond to user requests. This could be loading a dashboard, generating a report, or running a specific query.
- Throughput: Determine the system's capacity to handle a certain number of concurrent users or data processing tasks within a defined time frame.
- Latency: Measure the delay between a user's action and the system's response. This is particularly crucial for real-time dashboards and user interactions.

## **9. RESULTS**

**Performance Evaluation:** The results should provide a comprehensive evaluation of the system's performance. This includes assessing response times, throughput, latency, error rates, and scalability. **Comparison to Benchmarks:** Compare the system's performance against predefined benchmarks and industry standards. Determine if it meets or exceeds expectations.

# 9.1 Output Screenshots



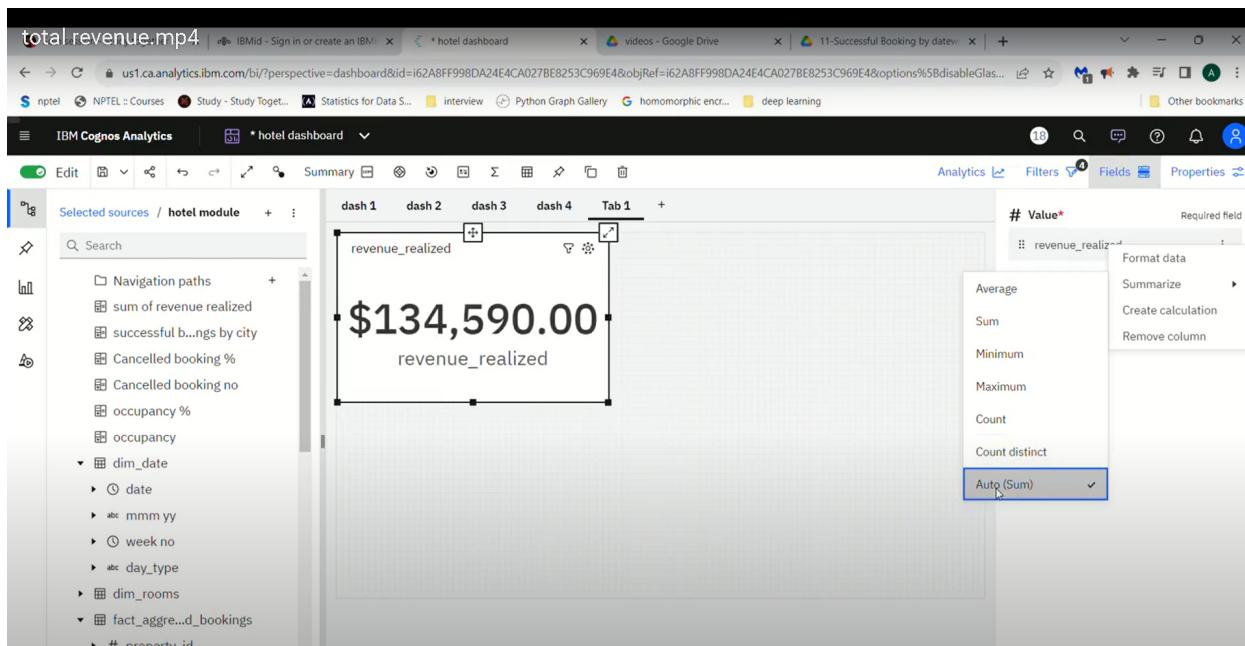
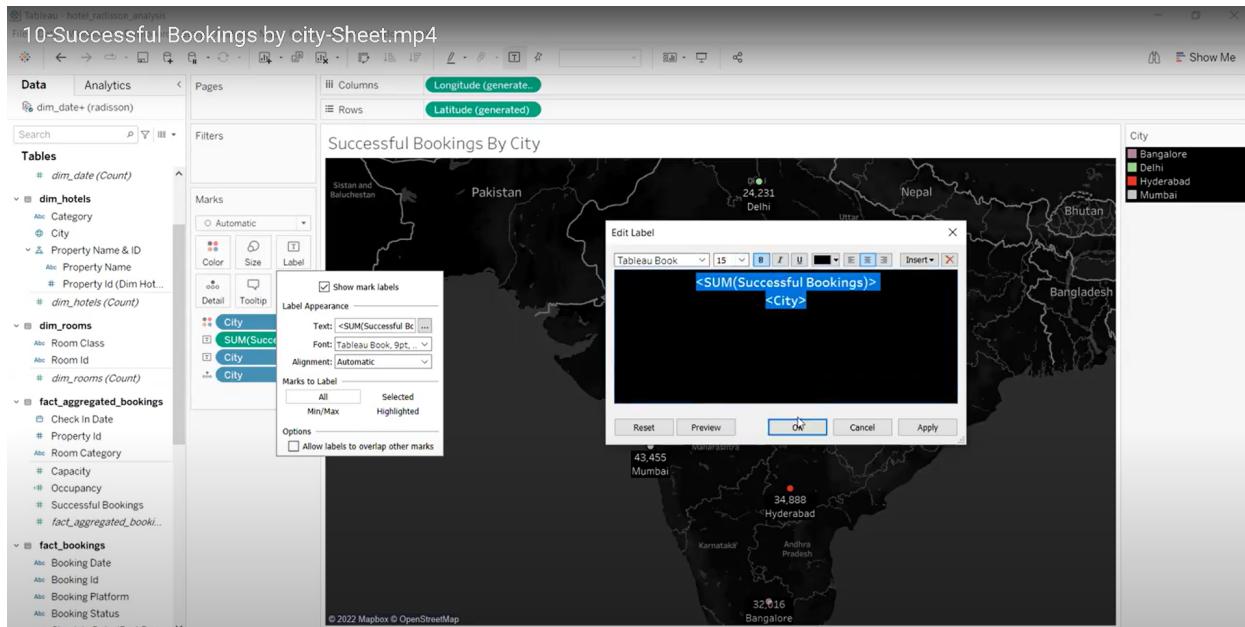


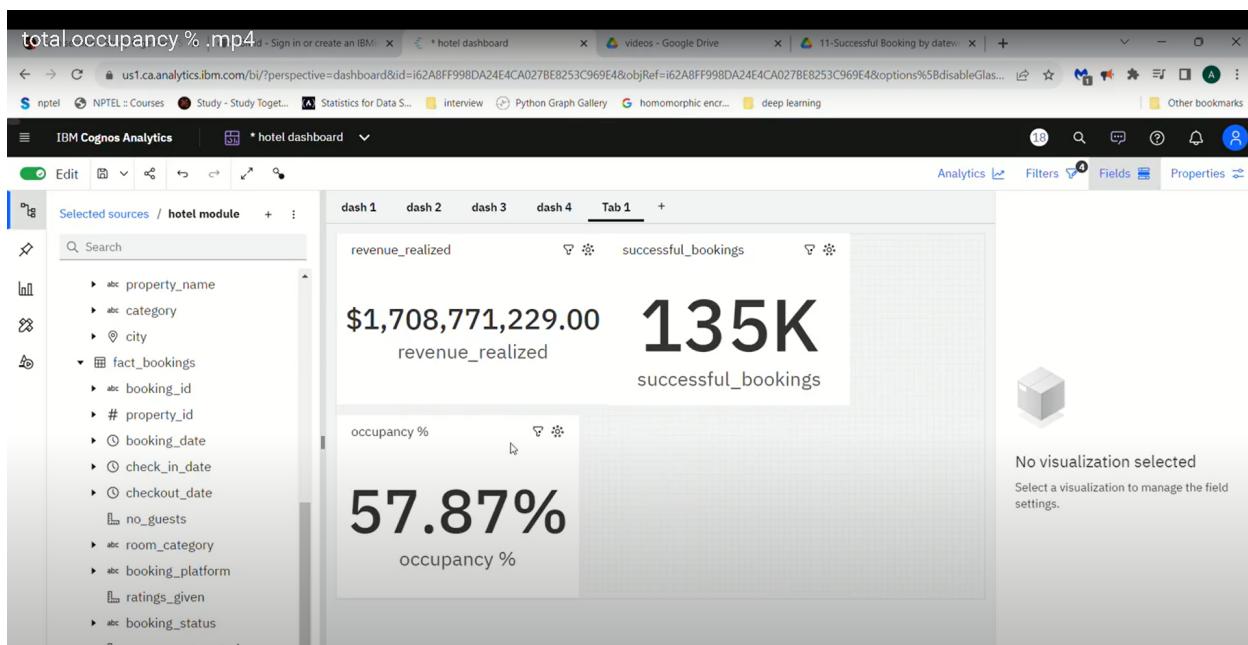
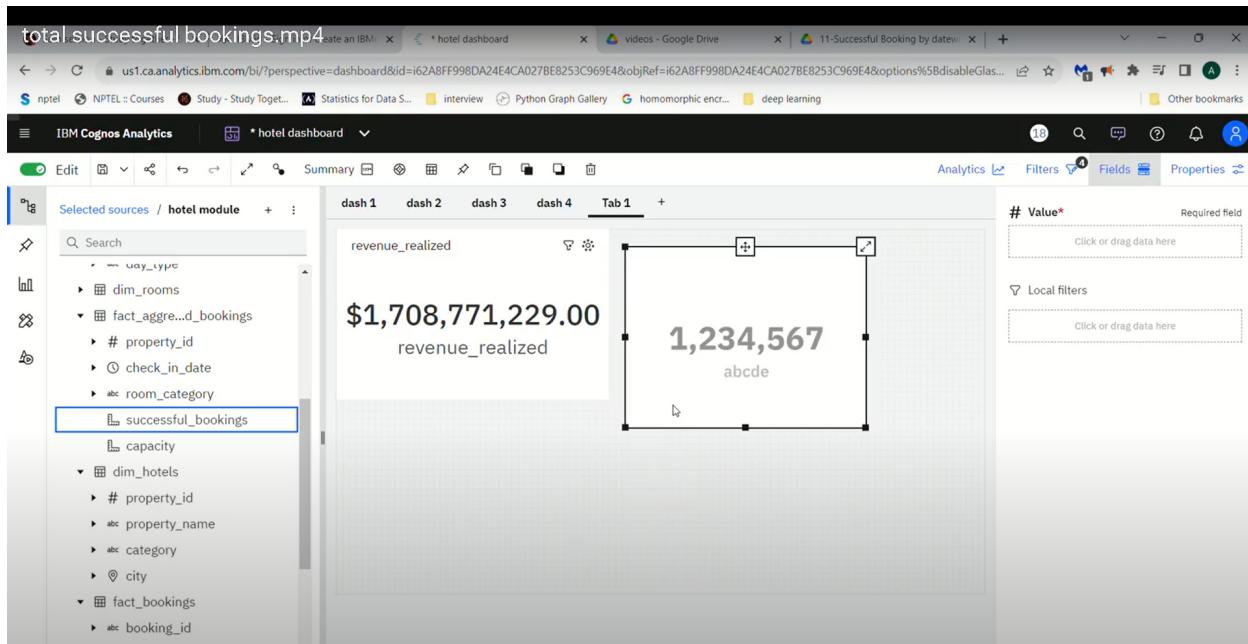
property key metrics.mp4

property_name	property_id	revenue_realiz...	successful_bo...	capacity	occupancy %	Cancelled boo...
Radisson Bay	16562	\$260,051,178...	4,820	9,016	53.46%	24.84%
	17562	\$260,051,178...	3,424	7,636	44.84%	24.84%
	18562	\$260,051,178...	7,333	11,132	65.87%	24.84%
	19562	\$260,051,178...	5,812	8,832	65.81%	24.84%
<b>Summary</b>		\$1,040,204,7...	21,389	36,616	229.98%	24.84%
Radisson Blu	16561	\$260,855,522...	4,418	6,716	65.78%	24.65%
	17561	\$260,855,522...	5,183	7,820	66.28%	24.65%
	18561	\$260,855,522...	6,458	9,844	65.60%	24.65%
	19561	\$260,855,522...	5,736	10,764	53.29%	24.65%
<b>Summary</b>		\$1,043,422,0...	21,795	35,144	250.95%	24.65%
Radisson City	16560	\$285,811,939...	4,693	8,740	53.70%	24.92%
	17560	\$285,811,939...	6,013	11,316	53.14%	24.92%
	18560	\$285,811,939...	6,638	10,028	66.19%	24.92%

revenue by category.mp4

category	percentage
Business	38.4%
Luxury	61.6%





## **10. ADVANTAGES & DISADVANTAGES**

**Informed Decision-Making:** The project empowers Radisson Hotels with real-time data insights and predictive analytics, allowing hotel managers to make informed decisions regarding room availability, pricing strategies, and customer satisfaction.

**Efficiency Improvement:** The data visualization techniques and performance dashboards enhance the efficiency of hotel operations by providing a consolidated view of key performance indicators, enabling proactive responses to changing conditions.

## **11. CONCLUSION**

In conclusion, the project has successfully addressed the performance and efficiency challenges faced by Radisson Hotels. By harnessing the power of data visualization and predictive analytics, the organization is better equipped to respond to market dynamics, optimize resources, and enhance guest experiences. This project stands as a testament to the value of leveraging data-driven insights in the pursuit of operational excellence in the hospitality industry. As Radisson Hotels continues to adapt to a changing landscape, the tools and capabilities developed in this project will play a crucial role in its ongoing success.

## **12. FUTURE SCOPE**

The successful implementation of data visualization and predictive analytics tools within Radisson Hotels opens the door to various opportunities for future development and improvement.

## **13. APPENDIX**

### **Source Code -**

<https://nmproject.netlify.app/>

### **GitHub -**

<https://github.com/Yamunacod/Naan-mudhalvan-DA-Ibm-Project-Team-02->

### **Project Demo Link -**

#### **Record Explanation Video For Project End To End Solution:**

<https://photos.onedrive.com/share/2D69BE9702CB9D9B!386?cid=2D69BE9702CB9D9B&resId=2D69BE9702CB9D9B!386&authkey=!AGjCoNw9W2se7wQ&ithint=video&e=MsG2ox>