A REPORT
ON

HOTEL HOSPITALITY ANALYSIS

Submitted by,

Mr. FAREEDAHMED HULLUR - 20211CSE0563

Under the guidance of,

Ms. SHET RESHMA PRAKASH

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

At

PRESIDENCY UNIVERSITY

BENGALURU

MAY 2025

PRESIDENCY UNIVERSITY

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Internship report **"HOTEL HOSPITALITY ANALYSIS** being submitted by "FAREEDAHMED HULLUR" bearing roll number "20211CSE0563" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a Bonafide work carried out under my supervision.

Ms. SHET RESHMA PRAKASH
Assistant Professor
PSCS
Presidency University

Dr. ASIF MOHAMMED
Associate Professor& HoD
PSCS
Presidency University

Dr. MYDHILI NAIR
Associate Dean
PSCS
Presidency University

Dr. SAMEERUDDIN KHAN
Pro-Vice Chancellor - Engineering
Dean –PSCS / PSIS
Presidency University

PRESIDENCY UNIVERSITY

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

DECLARATION

I hereby declare that the work, which is being presented in the report entitled "**HOTEL HOSPITALITY ANALYSIS"** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of my own investigations carried under the guidance of **SHET RESHMA PRAKASH, ASSISTANT PROFESSOR, Presidency School of Computer Science and Engineering, Presidency University, Bengaluru.**

I have not submitted the matter presented in this report anywhere for the award of any other Degree.

NAME	ROLL NUMBER	SIGNATURE
FAREEDAHMED HULLUR	20211CSE0563	

INTERNSHIP COMPLETION CERTIFICATE

ABSTRACT

This project presents a comprehensive data analysis and visualization system developed using Microsoft Power BI for the hotel hospitality sector. With growing competition and evolving customer expectations, the ability to make informed, data-driven decisions has become critical in hotel management. The aim of this internship project was to analyze operational and customer data to provide actionable insights through an interactive, real-time dashboard tailored for hotel stakeholders.

The data used in this project included booking records, customer demographics, feedback scores, room types, and revenue information. After preprocessing the data using Power Query, a data model was constructed, and key performance indicators (KPIs) such as Occupancy Rate, Revenue per Available Room (RevPAR), Average Daily Rate (ADR), and Length of Stay were calculated using DAX.

The resulting dashboards provided detailed visualizations on guest behavior, seasonal trends, booking sources, revenue patterns, and feedback analytics. These insights empower hotel managers to optimize pricing strategies, personalize services, monitor operational performance, and enhance guest satisfaction.

The report also explores existing research and highlights gaps in current data analysis methods in hospitality, positioning this Power BI-based system as a scalable and user-friendly solution. Overall, the project bridges the gap between data and decision-making, reinforcing the value of business intelligence tools in transforming hospitality operations.

ACKNOWLEDGEMENTS

First of all, we indebted to the **GOD ALMIGHTY** for giving me an opportunity to excel in our efforts to complete this project on time.

We express our sincere thanks to our respected dean **Dr. Md. Sameeruddin Khan**, Pro-VC - Engineering and Dean, Presidency School of Computer Science and Engineering & Presidency School of Information Science, Presidency University for getting us permission to undergo the project.

We express our heartfelt gratitude to our beloved Associate Dean **Dr. Mydhili Nair,** Presidency School of Computer Science and Engineering, Presidency University, and Dr. "Asif Mohammed", Head of the Department, Presidency School of Computer Science and Engineering, Presidency University, for rendering timely help in completing this project successfully.

We are greatly indebted to our guide **Ms. Shet Reshma Prakash, Assistant Professor** and Reviewer **Dr. Ranjitha, Assistant Professor**, Presidency School of Computer Science and Engineering, Presidency University for her inspirational guidance, and valuable suggestions and for providing us a chance to express our technical capabilities in every respect for the completion of the internship work.

We would like to convey our gratitude and heartfelt thanks to the CSE7301 Internship/University Project Coordinator **Mr. Md Ziaur Rahman and Dr. Sampath A K,** department Project Coordinators "Shet Reshma Prakash" and Git hub coordinator **Mr. Muthuraj.**

We thank our family and friends for the strong support and inspiration they have provided us in bringing out this project.

Fareedahmed Hullur

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

Chapter 1

INTRODUCTION

1.1 General

Hospitality is a fast-paced and competitive industry that has a major impact on the global economy. It involves a wide range of services, including accommodation, food and beverages, recreation, and travel. Of these, hotel services are important to meet the requirements of tourists, business travelers, and local customers. With the increasing expectations of guests and changes in market conditions at a rapid pace, hotel businesses need to implement contemporary tools and practices in order to remain relevant and profitable.

As more data is being generated in online bookings, customer reviews, transaction history, and social media, hotels today can leverage data-driven approaches for business and financial optimization. Business intelligence and visualization software such as Power BI have proven to be viable solutions for hotel performance understanding and optimization in real time.

1.2 Introduction to Data Analytics in Hospitality

Data analysis in the hospitality sector assists in transforming raw data into useful information that can enhance decision-making. It facilitates hotel managers to analyze trends like seasonal occupancy, customer tastes, spending habits, and feedback patterns. This enables better resource planning, pricing, marketing campaigns, and service improvements.

Specifically, descriptive and diagnostic analytics are applied to analyze historical and current performance, whereas predictive analytics predicts customer behavior and future demand. Prescriptive analytics, though still evolving in most hotel operations, gives guidance on what to do for best outcomes.

1.2.1 About Power BI

Power BI, created by Microsoft, is a top business intelligence tool that allows raw data to be transformed into interactive dashboards and visual reports. Power BI facilitates the integration of multiple data sources, including Excel files, SQL databases, and cloud services, to provide a unified view of business operations.

Power BI offers key features such as:

- Drag-and-drop report creation
- Built-in data modelling tools
- DAX (Data Analysis Expressions) for custom calculations
- Real-time data updates through Power BI services
- Easy sharing and publishing options

By using Power BI in this project, we aim to simplify the analysis of complex datasets and enable intuitive understanding through engaging visuals.

1.3 Project Relevance

This project focuses on the analysis of hospitality data collected from a hotel environment. The data includes customer information, booking records, room occupancy, and customer feedback. The goal is to use Power BI to create dashboards that visually represent key insights such as:

- Peak and off-peak booking patterns
- Revenue distribution across customer segments
- Impact of different booking sources (e.g., online portals, direct walk-ins)
- Customer satisfaction trends

The relevance of this project lies in its ability to support real-time decision-making and provide strategic inputs for operational improvement. The use of business intelligence in hotel management is becoming a necessity rather than a luxury, and this project serves as a practical example of how modern tools can elevate traditional hospitality practices.

Chapter 2

LITERATURE SURVEY

2.1 General

The use of data analytics in hospitality has been heavily researched and covered in the last ten years. With advancements in technology, hotels have been leaning more and more towards data-informed tools for optimizing operational performance and customer satisfaction. Literature here indicates that business intelligence tools and visual analytics solutions like Power BI play a central role in processing raw hospitality data into meaningful information.

Several researches have focused on how hotels can use analytics for dynamic pricing, forecasting demand, customer segmentation, and monitoring satisfaction. With the advent of digital reservation systems, customer review websites, and integrated CRM applications, more data is now available that needs to be efficiently analyzed with strong tools.

2.2 Previous Work and Case Studies

Ivanov and Webster (2019), in their Hotel Revenue Management: From Theory to Practice book, provided an end-to-end framework for hotel revenue management. They highlighted the combination of forecasting and optimisation tools, with the significance of real-time dashboards to dynamically adjust room rates and availability.

Brotherton (2018) presented in-depth hospitality research methodology, contending that systematic data analysis supports strategic decision-making. His paper demonstrates the ability of empirical research to unveil patterns in guests' preferences and operational bottlenecks.

Kim and Hardin (2010), in Hospitality Information Technology, outlined the ways in which technology adoption impacts service quality within hotels. They examined the use of visual reporting tools to allow employees to comprehend trends and respond quickly to customer comment.

A Marriott Hotels (2021) case study featured their roll-out of Power BI to monitor occupancy levels, guest feedback, and housekeeping performance at international branches. They cited an improvement in business responsiveness and customer satisfaction rates by virtue of being able to see real-time data.

2.3 Emerging Trends

Current trends in the hospitality industry suggest the implementation of AI and machine learning to provide better predictive solutions. Solutions today offer functionalities such as:

- Predicting demand through historical trends
- Suggesting best room rates through regression
- Sentiment analysis of guest feedback
- Visualization of performance across geographies in one dashboard

IoT devices in rooms (e.g., smart thermostats, lights, and door locks) add useful information, which can also be examined to determine energy efficiency and guest customizations.

Cloud solutions such as Power BI offer scalability, remote connectivity, and remote visibility, so that hotel executives may track performance throughout branches and divisions from any possible location.

2.4 Research Implications

Literature is evidence enough for the increasing need for data analytics within the hospitality sector. Yet, despite this, problems like inadequate data quality, absence of technical competence among employees, and too high an initial setup cost remain. This internship project seeks to overcome these drawbacks through its emphasis on:

- Clean, structured data integration
- Comprehensible dashboards for use by hotel employees
- Cost-effective analysis utilizing freely available software such as Power BI Desktop

This poll lays an ideal basis to develop an impactful, scalable, and visually stunning analytics solution to accommodate the hotel operation of the day.

Chapter 3

RESEARCH GAPS OF EXISTING METHODS

3.1 General

The use of data analytics in the hospitality industry has proven valuable in several aspects, such as demand forecasting, customer segmentation, and service optimization. However, despite significant advancements in data processing and visualization technologies, a number of gaps still exist in the practical implementation of these methods across small- to mid-sized hotels and even large chains with outdated systems.

Existing systems tend to rely on legacy tools and static reports that do not provide real-time insights or the flexibility required to make swift decisions in a dynamic environment. These limitations reduce the strategic advantage that data analytics can provide in customer satisfaction and profitability.

3.2 Observed Gaps in Literature and Practice

From the literature analysed and industry insights, the following key research and practical gaps have been established:

3.2.1 Inadequate Real-Time Analytics

- Most of the conventional hotel management systems fail to provide real-time dashboards that represent changes in bookings, revenue, or guest reviews occurring in real-time. Latency in updating data can compromise on-time decision-making and responsiveness.

3.2.2 Limited Integration of Multisource Data

- Most systems simply examine isolated booking or financial information. Little or no combination of data from customer feedback, room occupancy, seasonal patterns, and marketing sources exists, potentially reducing the insights gained.

3.2.3 Lack of Customization for Departmental Use

- Most dashboards are not created with the ability to adapt to various departments. Housekeeping, marketing, front office, and revenue management each need

customized analytics, but most platforms only offer generic reports.

3.2.4 Absence of Predictive and Prescriptive Features

While descriptive and diagnostic analytics are prevalent, predictive and prescriptive analytics—employing AI and machine learning to predict demand or suggest actions—are not yet common in hospitality platforms, particularly in the smaller ones.

3.2.5 Complexity in Use for Non-Technical Staff

Most business intelligence tools are technical and hence not easily accessible for non-technical personnel in hotels. This usually leads to partial utilization of powerful analytics capabilities.

3.2.6 Insufficient Visualization Tools

Legacy platforms typically don't have intuitive visual story-telling features. Graphs and KPIs, when they do exist, are either stale or overly complicated, which hinders rapid and meaningful interpretation by hotel decision-makers.

3.3 Justification for the Proposed System

The project proposed here is to bridge these gaps through Power BI, a powerful, affordable, and easy-to-use data visualization tool. It is particularly suited for dynamic and customizable dashboards that:

- Support real-time monitoring of KPIs by multiple departments
- Support data consolidation from multiple sources such as Excel, databases, and online resources

Empower both technical and non-technical users to extract insights through interactive visuals

- Provide a scalable solution that is applicable to hotels of various sizes and needs
- Provide support for adding predictive models to future releases

This internship project adds a hands-on, real-time analytics model that is user-friendly, department-focused, and scalable, correcting the biggest drawbacks in existing hospitality analytics platforms.

Chapter 4

PROPOSED MOTHODOLOGY

4.1 General Overview

In order to rectify the known gaps in existing hospitality data systems, this project suggests the construction of a Power BI-based data analytics dashboard for hotel operations in particular. Methodology is subdivided into progressive phases—data collection, preprocessing, dashboard designing, implementation, testing, and feedback iteration. Each phase has been structured to be a buildup of the previous one, which eventually leads to an interactive, user-friendly solution that provides real-time operational insights.

4.2 Phase I: Data Collection

The initial phase involves collecting relevant data from hotel operations. The dataset used in this project includes:

- Guest check-in/check-out data
- Booking sources (OTAs, website, direct walk-ins)
- Room types and occupancy status
- Payment details and duration of stay
- Guest demographics (age, gender, country)
- Feedback and review scores
- Seasonal data for peak/off-peak comparisons

This data was obtained in the form of CSV and Excel files, emulating the format typically used by small to mid-size hotel property management systems (PMS).

4.3 Phase II: Data Cleaning and Preprocessing

Data preprocessing was carried out using Power Query Editor in Power BI and Microsoft Excel. This step included:

- Removing duplicate entries
- Handling missing values using mean/mode imputation
- Date fields converted to a uniform format
- Normalizing categorical variables (room types)
- Calculated columns created for revenue, average length of stay, RevPAR, and ADR
- Data validated in this phase to be accurate, complete, and visualization-ready.

4.4 Phase III: Data Modeling and Relationship Building

- In order to properly examine several tables and datasets, a data model had been established in Power BI:
- Fact table: Booking information
- Dimension tables: Guests, Rooms, Seasons, Reviews
- Relationships: Established by primary and foreign keys (e.g., Room ID, Guest ID)

Custom measurements were calculated using DAX (Data Analysis Expressions) such as:

4.5 Phase IV: Dashboard Design and Development

- According to the needs of various stakeholders (front desk, hotel manager, marketing department), several dashboards were created:
- Revenue Dashboard: Yearly/monthly income, RevPAR, ADR
- Guest Demographics Dashboard: Country of origin, age groups, repeat guests
- Room Occupancy Dashboard: Weekly/daily occupancy patterns, room type distribution
- Booking Source Dashboard: % share of OTAs, agents, website, direct
- Review Analysis Dashboard: Keyword trends in feedback, average ratings
- Interactive visuals employed are bar graphs, pie charts, slicers, line charts, maps, and gauge charts

4.6 Phase V: Implementation & Testing

Depending on the needs of various stakeholders (hotel manager, front desk, marketing department), several dashboards were created:

- Revenue Dashboard: Monthly/annual income, RevPAR, ADR
- Guest Demographics Dashboard: Age bands, country of origin, repeat guests
- Room Occupancy Dashboard: Daily/weekly occupancy trends, room type analysis
- Booking Source Dashboard: % share of OTAs, website, agents, direct
- The dashboards were posted to the Power BI Service for stakeholders to review.

The following elements were tested:

- Accuracy of filters and slicers
- Visual load time with big data
- Behavior of real-time update
- Consistency of cross-visual filtering
- Responsiveness of layout across devices (desktop, tablet)
- Feedback from mock users (staff and peers) was gathered and utilized to improve usability and layout design.

4.7 Tools and Technologies Used

Tool	Purpose
Power BI Desktop	Dashboard creation & modeling
Power Query	Data transformation & cleaning
DAX	Custom calculations & KPIs
Excel	Initial data formatting & backup
Power BI Service	Sharing reports & testing accessibility

Chapter 5

OBJECTIVES

5.1 General Objective

The principal objective of this project is to leverage data visualization technologies—Microsoft Power BI in this case—to model, visualize, and analyze hotel hospitality data to enhance decision-making, streamline operations, and maximize revenue generation. The project seeks to close the gap between raw operational data and strategic insights that drive hotel management on a daily basis.

5.2 Specific Objectives

The following specific objectives were defined to meet the project's general goal:

5.2.1 To Design a Real-Time, Interactive Dashboard

- Design an easy-to-use interface with Power BI to track KPIs in real-time.
- Design dashboards that graphically display customer demographics, booking patterns, seasonal fluctuations, and room occupancy.

5.2.2 To Analyze Customer Behavior and Preferences

- Analyze guest booking behavior, repeat visit percentage, length of stay, and source of booking (OTA, direct, walk-in).
- Determine customer segments to support personalized marketing initiatives.

5.2.3 To Forecast Occupancy and Revenue Patterns

- Utilize historical data to compare trends in occupancy levels, average daily rates (ADR), and revenue per available room (RevPAR).
- Forecasts peak and off-peak seasons to inform resource planning.

5.2.4 To Evaluate the Efficiency of Booking Channels

- Identify the efficiency of varied booking channels like travel agencies, internet portals, and direct bookings.
- Prescribe methods to maximize cost savings and raise direct bookings.

5.2.5 To Assess Guest Feedback and Satisfaction Levels

- Evaluate reviews and ratings from guests to determine positives and negatives.
- Create visual insights into the number and nature of guest complaints or compliments.

5.2.6 To Enable Data-Driven Decision Making

- Give hotel management useful insights from data.
- Help decision-makers maximize pricing, staffing, and promotional campaigns.

5.2.7 To Encourage the Adoption of Business Intelligence Tools

- Show how Power BI can turn raw data into actionable intelligence.
- Deliver a working prototype that can be scaled across multiple hotel branches or chains.

Chapter 6

SYSTEM DESIGN & IMPLEMENTATION

6.1 System Overview

The system built in this project targets the development of an integrated, modular Power BI dashboard that unifies various hotel data sources into a coherent visual presentation. The system architecture supports hotel managers in interactively browsing patterns, producing performance reports, and facilitating decision-making across departments.

This chapter outlines the architecture, design modules, data flow, tools employed, and step-by-step implementation plan.

6.2 System Architecture

The solution follows a three-tier architectural model:

6.2.1 Data Source Layer

- Hotel operation data from Excel spreadsheets (.xlsx, .csv)
- Guest feedback and review data
- Financial transaction logs
- Static tables for room types, services, and booking channels

6.2.2 Data Processing Layer

- Data import using Power Query
- Cleaning and preprocessing (null handling, formatting, duplication checks)
- Relationship modeling using Power BI's data model
- Calculated columns and measures using DAX

6.2.3 Presentation Layer (Dashboard)

- Power BI dashboard with slicers, KPIs, graphs, and tables
- Filters for time periods, room types, customer nationality, etc.
- Interactivity between visuals using cross-filtering and drill-through

6.3 Module Design

The system is divided into functional modules, each targeting a specific aspect of hotel operations:

Module Name	Description
Guest Profile	Shows nationality, age group, gender, and repeat visits
Booking Trends	Visualizes seasonal peaks, booking lead times, and length of stay
Occupancy Analysis	Daily/monthly occupancy rates by room type and season
Revenue Insights	Displays ADR, RevPAR, total revenue, and comparison by source/channel
Feedback Analysis	Guest satisfaction scores, review keywords, and sentiment trends

6.4 Data Flow Diagram (DFD)

A Level 1 DFD of the system would show the flow of data from external sources (CSV/Excel) → through transformation in Power Query → modeled in Power BI → visualized on the dashboard.

6.5 Implementation Steps

Step 1: Data Import

Multiple Excel sheets containing hotel bookings, room data, customer data, and reviews were imported into Power BI.

Step 2: Data Cleaning

- Using Power Query Editor:
- Removed null entries
- Converted date formats to DD-MM-YYYY
- Standardized room type entries

- Joined related tables using foreign keys

Step 3: Data Modeling

- Defined one-to-many relationships
- Created calculated columns: Length of Stay, Net Revenue, Repeat Guest
- Measures created using DAX:

DAX

- RevPAR = [Total Revenue] / [Available Rooms]
- Occupancy Rate = COUNT(Bookings[RoomID]) / COUNT(Rooms[RoomID])
- Step 4: Dashboard Development

Created individual pages in Power BI:

- Revenue Dashboard
- Guest Analytics Dashboard
- Booking Source Dashboard
- Room Utilization Dashboard
- Review & Feedback Dashboard

Each page includes slicers for year/month, customer type, booking channel, and room type.

Step 5: Testing & Deployment

- Tested visual responsiveness and slicer interactions
- Validated values with Excel backups
- Published to Power BI service for accessibility and sharing

6.6 Technologies Used

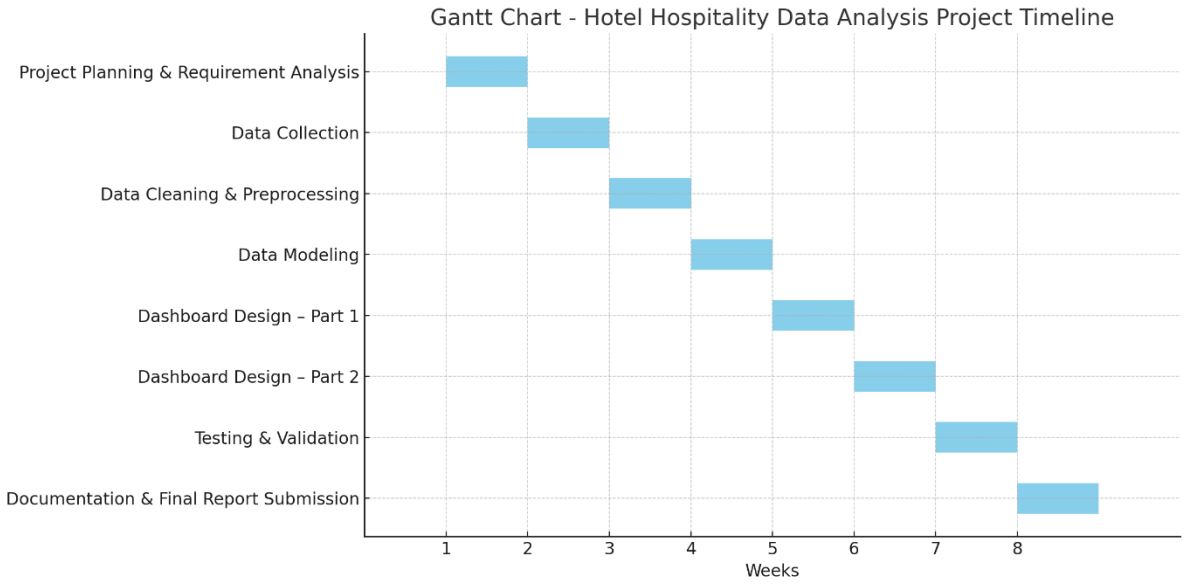
Tool/Technology	Purpose
Power BI Desktop	Core dashboard development and data modeling
Power Query Editor	Data cleaning and transformation
DAX	Calculated columns and measures
Microsoft Excel	Data input, cleaning, and formatting
Power BI Service	Report sharing and online accessibility

Chapter-7

TIMELINE FOR EXECUTION OF PROJECT (GANTT CHART)

7.1 General

Effective planning and phased implementation were crucial in ensuring the effective completion of the internship project. The project was executed over 8 weeks, and every activity was broken into manageable, goal-based tasks. A Gantt chart was applied to track visually progress and maintain timely delivery of every project milestone.



7.2 Interpretation of the Gantt Chart

- The project followed a linear, phase-by-phase model, with every week building on the work of the previous week.
- Tasks such as data modeling and dashboard creation were divided over two weeks to accommodate testing and improvement.
- Testing and documentation were scheduled towards the end to make sure end deliverables represented true results and conclusions.
- This formal timeline kept things transparent with respect to goals and allowed effective utilization of internship time.

Chapter 8

OUTCOMES

8.1 General

The main goal of this internship was to deploy a real-time, interactive, and user-friendly data analysis solution through Power BI for the hospitality industry. The internship ended with the creation of a series of dynamic dashboards visualizing the important key performance indicators (KPIs), facilitating decision-making, and enhancing strategic hotel management. This chapter elaborates on the specific results achieved through the execution of the suggested methodology.

8.2 Technical Outcomes

8.2.1 Data Pipeline Establishment

- Successfully acquired and cleaned multi-source hotel data such as bookings, guests, comments, room availability, and payments.
- Maintained data integrity through effective preprocessing via Power Query Editor.

8.2.2 Data Modeling and KPI Calculations

- Created a streamlined data model based on fact and dimension tables in Power BI.
- Developed calculated metrics like Occupancy Rate, RevPAR, ADR, and Length of Stay with DAX.

8.2.3 Interactive Dashboard Development

- Built several Power BI dashboards that are specific to different hotel departments:
- Revenue Dashboard: Illustrates overall income patterns and RevPAR per room type.
- Guest Insights Dashboard: Illustrates age groups, nationalities, and guest behavior.
- Booking Source Dashboard: Illustrates OTA, walk-in, and website booking performance.
- Room Utilization Dashboard: Illustrates occupancy over time by room types.
- Feedback Dashboard: Tracks guest ratings and visualizes sentiment.

8.3 Functional Outcomes

8.3.1 Enhanced Operational Visibility

- Gave decision-makers a 360-degree perspective of hotel operations and guest trends.
- Enhanced guest preferences, which resulted in focused service enhancements.

8.3.2 Strategic Planning Support

- Facilitated the grasp by management of seasonal performance and the preparation of promotional strategies accordingly.
- Enabled the sales team to prioritize high-performing booking channels.

8.3.3 Decision Support System (DSS)

- The dashboard is now an in-brief decision-support tool for department heads and general managers.
- Enabled stakeholders to view important KPIs from any device through Power BI Service.

8.4 Learning Outcomes

8.4.1 Technical Skills Gained

- Skilled utilization of Power BI Desktop and Power BI Service
- Mastering Power Query and DAX expressions
- Data modeling principles and dashboard design guidelines

8.4.2 Analytical Thinking

- Established a deep grasp of converting raw data into useful insights
- Enhanced capability to recognize useful trends and patterns in the behavior of customers

8.4.3 Industry Relevance

- Gained knowledge of real-world hospitality operations and their dependence on digital transformation
- Acquired knowledge on how to tailor BI tools to individual organizational departments and end-user requirements

Chapter 9

RESULTS AND DISCUSSIONS

9.1 General

The end result of the project was an operational, dynamic, and interactive dashboard system developed through Microsoft Power BI. This chapter outlines the major results produced by the dashboard and explains their applicability in actual hotel management. The arguments discuss how the analytical results facilitate different operational, marketing, and strategic choices across the hospitality industry.

9.2 Key Results

9.2.1 Occupancy Trends

- Highest occupancy was found during December and May, which coincided with holiday periods and local events.
- Mid-week days (Tuesday to Thursday) exhibited steady occupancy by business travelers, while weekends exhibited an increase due to family/leisure stays.

9.2.2 Revenue Analysis

- The highest revenue came from the Deluxe Room category, even though it had fewer bookings than others, meaning better price margins.
- The RevPAR indicator fluctuated seasonally with a significant fall during off-peak months (June, July).

9.2.3 Booking Source Performance

- Online Travel Agencies (OTAs) contributed to over 50% of total bookings, followed by direct website bookings at 30% and walk-ins at 20%.
- Direct bookings showed a higher average transaction value due to bundling with food and spa services.

9.2.4 Customer Feedback Trends

- Average customer rating was 4.2/5, with key strengths being room cleanliness and staff behavior.
- Common issues included delays in room service and Wi-Fi speed in certain areas of

the hotel.

9.3 Visual Insights & Interactivity

Filters and slicers enabled managers to see results by date, room type, guest nationality, and booking channel.

Cross-filtering allowed for dynamic drilling into data — i.e., choosing a country would instantly show related booking volumes, revenue, and guest reviews.

9.4 Discussion and Interpretation

Operational Impact

- The revenue and occupancy insights enable the management to align staffing schedules, maintenance schedules, and inventory management with seasonal trends.

- Customer preference data enable focused promotions and offer bundling to maximize average revenue per guest.

Marketing Strategy Insights

- The source-based analysis indicates that OTA dependence is high; there should be an attempt to encourage direct bookings through loyalty rewards and discounts.

Service Quality Enhancement

- Customer sentiment analysis identifies specific areas of service that require improvement. This enables the hotel to take proactive action to improve the guest experience

9.5 Challenges Faced

Challenge	Solution
Data formatting inconsistencies across sources	Used Power Query Editor to clean and align formats
Missing values in some guest review records	Applied statistical imputation and filtering
Dashboard performance lag for large datasets	Implemented data aggregation and optimized measures
Difficulty in aligning multiple date columns	Unified date columns using calculated fields

9.6 Summary

The results show the impact of data analytics applied properly on enhancing the operations and quality of service of hotels. The real-time dashboard not only enhances departmental visibility but also serves as a predictive and strategic tool. The outcomes of internships confirm the feasibility and importance of using data-driven solutions in hospitality management.

Chapter 10

CONCLUSION

10.1 Summary of Work

This project was centered around the utilization of business intelligence software, namely Microsoft Power BI, within the field of hotel hospitality management. The aim was to review past data regarding customer bookings, revenue, occupancy, and customer feedback, and to display this information in dynamic dashboards that would assist hotel management in decision-making.

Throughout the internship, there was a systematic approach beginning with data cleansing and collection, to modeling, dashboard creation, testing, and analysis. The Power BI dashboard created gives an integrated, visually interactive interface for hotel managers and operational staff to track key performance indicators (KPIs), comprehend customer behavior, and enhance operational effectiveness.

10.2 Major Findings

- Occupancy and revenue were highly seasonal, with significant fluctuations during holidays and events.

- Analysis of booking sources indicated the significance of OTAs and direct website bookings, offering insights for designing promotional strategies.

- Customer demographics and feedback enabled segmentation and personalization opportunities, improving guest satisfaction.

- Data modeling and DAX calculations were crucial in calculating advanced metrics such as RevPAR, ADR, and Length of Stay, offering greater business value.

10.3 Value to the Hospitality Industry

This project shows how real-time data dashboards can convert raw data into strategic intelligence. With an easy-to-use tool such as Power BI, even non-technical hotel employees can analyze trends, monitor performance, and make informed decisions.

Some concrete advantages to the sector are:

- Efficient reporting with automated visualizations and filtering
- Unified access to departmental KPIs
- Data-driven planning for pricing, promotions, and staffing
- A solution that can be scaled up to other departments or branches

10.4 Personal Learning and Development

Being an intern and a student, this project was important in gaining hands-on experience in:

- Comprehending the end-to-end data lifecycle: from raw files to end dashboards
- Proficiency in Power BI as a commercial analytics tool
- Enhancing analytical thinking and problem-solving skills
- Exposure to hospitality-specific data analytics use cases

10.5 Future Scope

While today's system offers extensive descriptive and diagnostic analytics, there is scope for enrichment:

- Embedding machine learning models to enable predictive analytics (e.g., demand forecasting)
- Utilization of AI-powered chatbots to suggest offers based on customer profiles
- Real-time connectivity with cloud-hosted hotel management systems
- Rollout of mobile-optimized dashboards for remote monitoring

10.6 Final Thoughts

The success of the project once again underscores the increasing need for digital transformation within the hospitality industry. A thoughtfully designed dashboard not only enhances transparency in operations but also lays the groundwork for wiser, more responsive service. This internship has been the precursor to a future filled with hope and possibilities to leverage data to drive impact—both personally and in the hospitality sector as a whole.

REFERENCES

1. Ivanov, S., & Webster, C. (2019). Hotel Revenue Management: From Theory to Practice. Emerald Group Publishing.

2. Brotherton, B. (2018). Researching Hospitality and Tourism: A Student Guide. SAGE Publications.

3. Kim, W. G., & Hardin, A. M. (2010). Hospitality Information Technology: Learning How to Use It. Kendall Hunt Publishing.

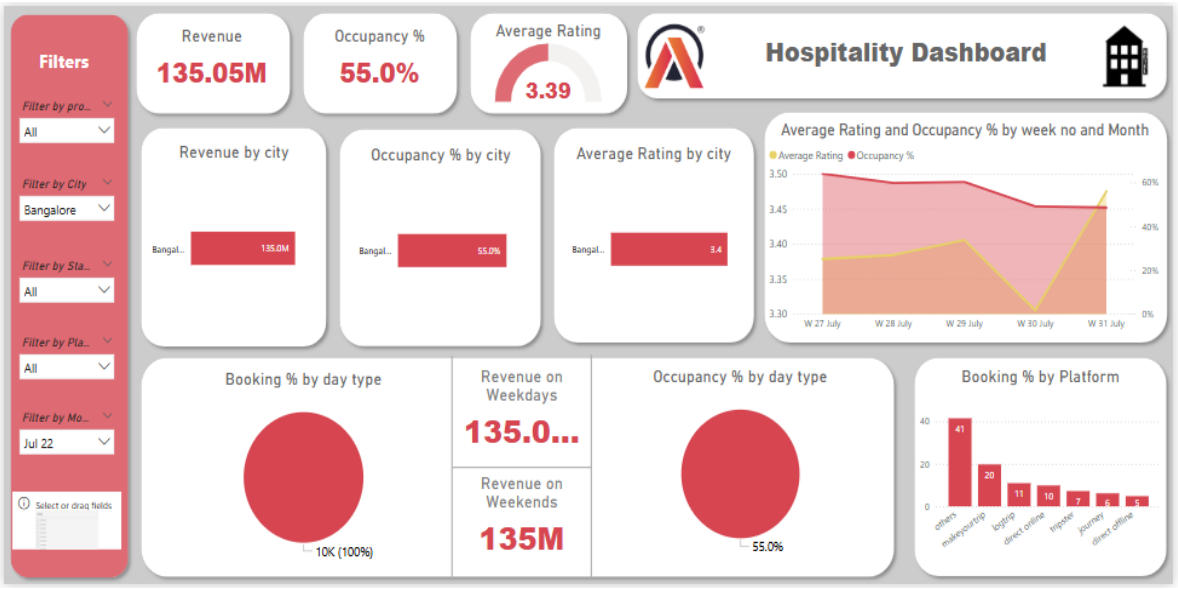
4. Power BI Documentation. Microsoft. Available at: https://learn.microsoft.com/en-us/power-bi/

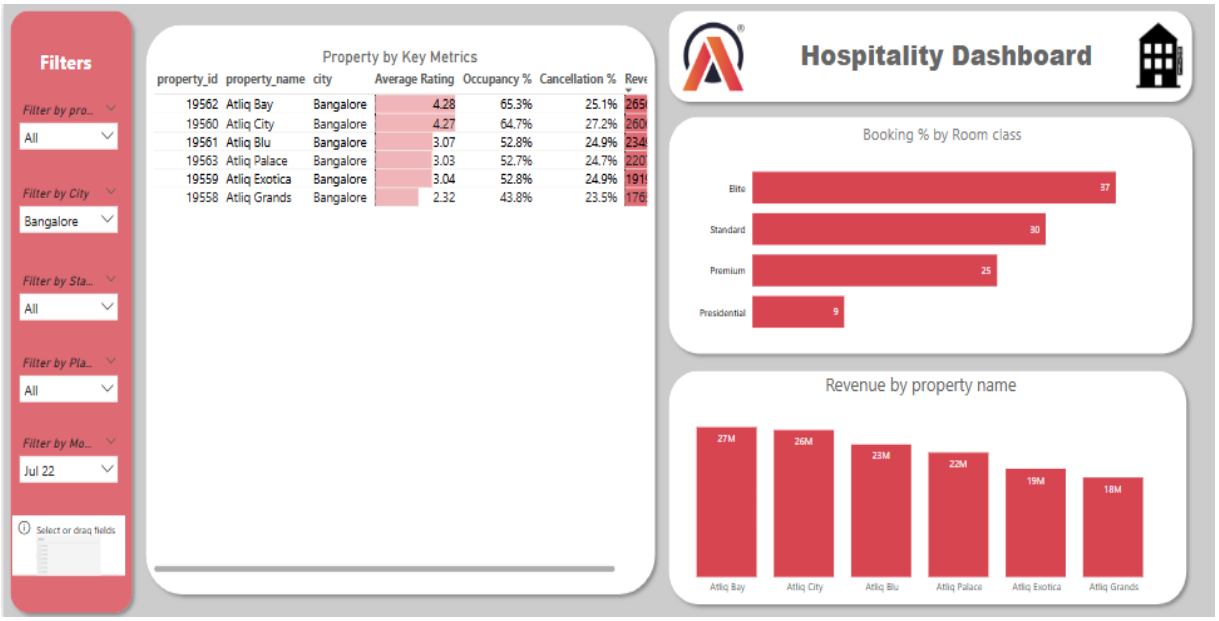
5. Kimes, S. E. (2011). The future of hotel revenue management. Journal of Revenue and Pricing Management, 10(1), 62–72.

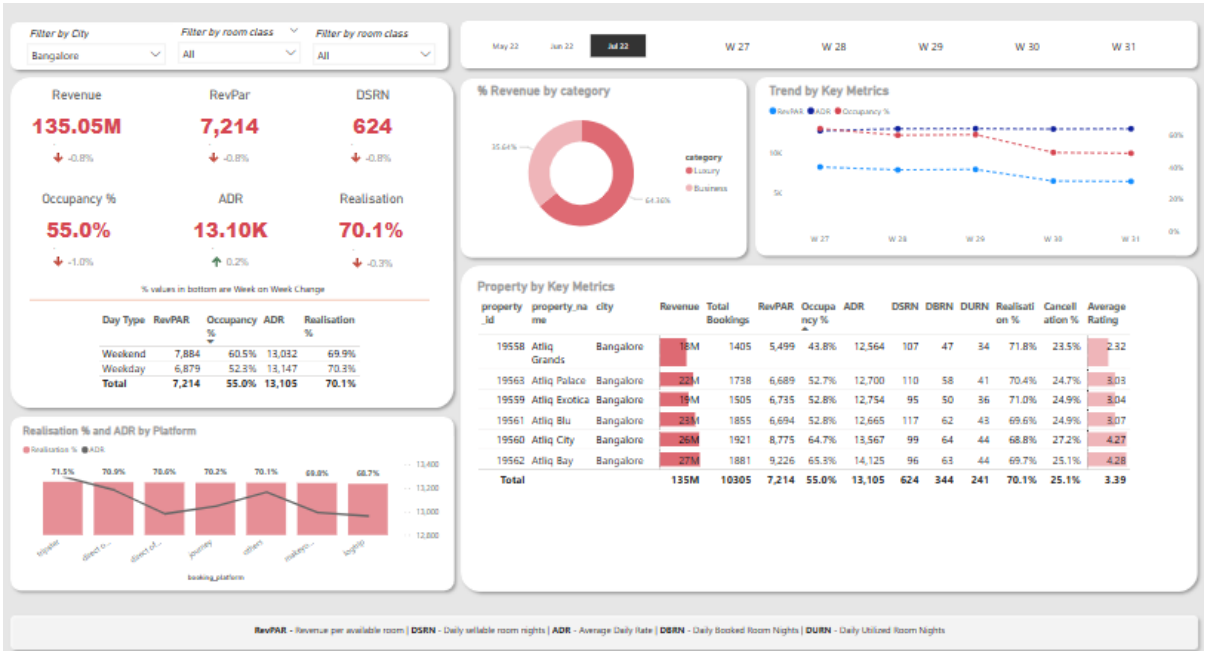
6. Ramanathan, U. (2012). Performance of hotels in the UK: Do the levels of satisfaction of hotel customer's matter? International Journal of Contemporary Hospitality Management, 24(4), 542–557.

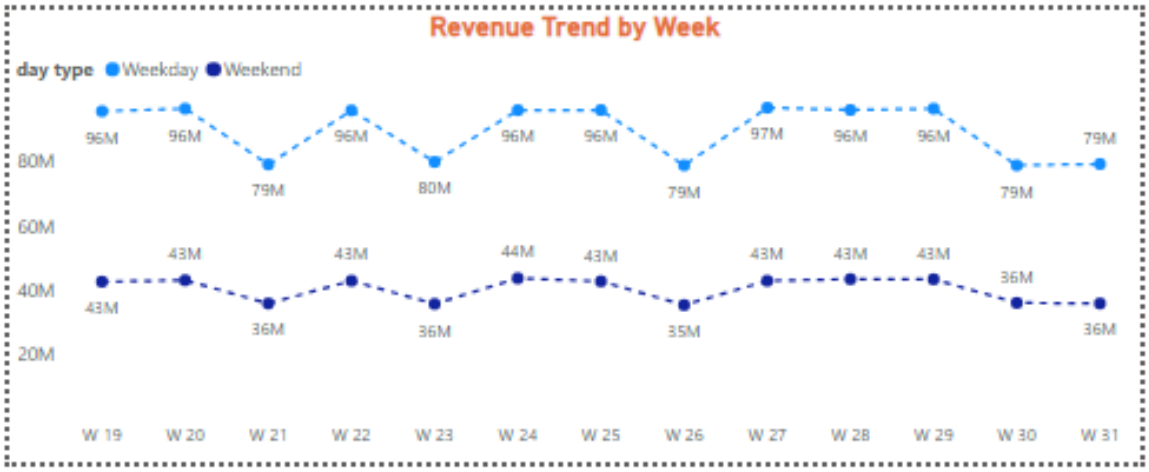
7. Chathoth, P. K., & Olsen, M. D. (2003). Strategic alliances: A hospitality industry perspective. International Journal of Hospitality Management, 22(4), 419–434.

APPENDIX-B
SCREENSHOTS






Filter by City
Bangalore
Filter by room class
All
Filter by room class
All
Revenue
135.05M
RevPar
7,214
DSRN
624
Occupancy %
55.0%
ADR
13.10K
Realisation
70.1%
% values in bottom are Week on Week Change
Day Type RevPAR Occupancy % ADR Realisation %
Weekend 7,884 60.5% 13,032 69.9%
Weekday 6,879 52.3% 13,147 70.3%
Total 7,214 55.0% 13,105 70.1%
% Revenue by category
category
Luxury
Business
Trend by Key Metrics
Realisation % and ADR by Platform
71.5% 70.9% 70.6% 70.2% 70.1% 69.8% 68.7%
booking_platform
Property by Key Metrics
property_id property_name city Revenue Total Bookings RevPAR Occupancy % ADR DSRN DBRN DURN Realisation % Cancellation % Average Rating
19558 Atliq Grands Bangalore 18M 1405 5,499 43.8% 12,564 107 47 34 71.8% 23.5% 2.32
19563 Atliq Palace Bangalore 22M 1738 6,689 52.7% 12,700 110 58 41 70.4% 24.7% 3.03
19559 Atliq Exotica Bangalore 19M 1505 6,735 52.8% 12,754 95 50 36 71.0% 24.9% 3.04
19561 Atliq Blu Bangalore 23M 1855 6,694 52.8% 12,665 117 62 43 69.6% 24.9% 3.07
19560 Atliq City Bangalore 26M 1921 8,775 64.7% 13,567 99 64 44 68.8% 27.2% 4.27
19562 Atliq Bay Bangalore 27M 1881 9,226 65.3% 14,125 96 63 44 69.7% 25.1% 4.28
Total 135M 10305 7,214 55.0% 13,105 624 344 241 70.1% 25.1% 3.39
RevPAR - Revenue per available room | DSRN - Daily sellable room nights | ADR - Average Daily Rate | DBRN - Daily Booked Room Nights | DURN - Daily Utilized Room Nights


Revenue Trend by Week
day type Weekday Weekend
80M
60M
40M
20M
96M 96M 79M 96M 80M 96M 96M 79M 97M 96M 96M 79M 79M
43M 43M 36M 43M 36M 44M 43M 35M 43M 43M 43M 36M 36M
W 19 W 20 W 21 W 22 W 23 W 24 W 25 W 26 W 27 W 28 W 29 W 30 W 31

PLAGIARISM REPORT

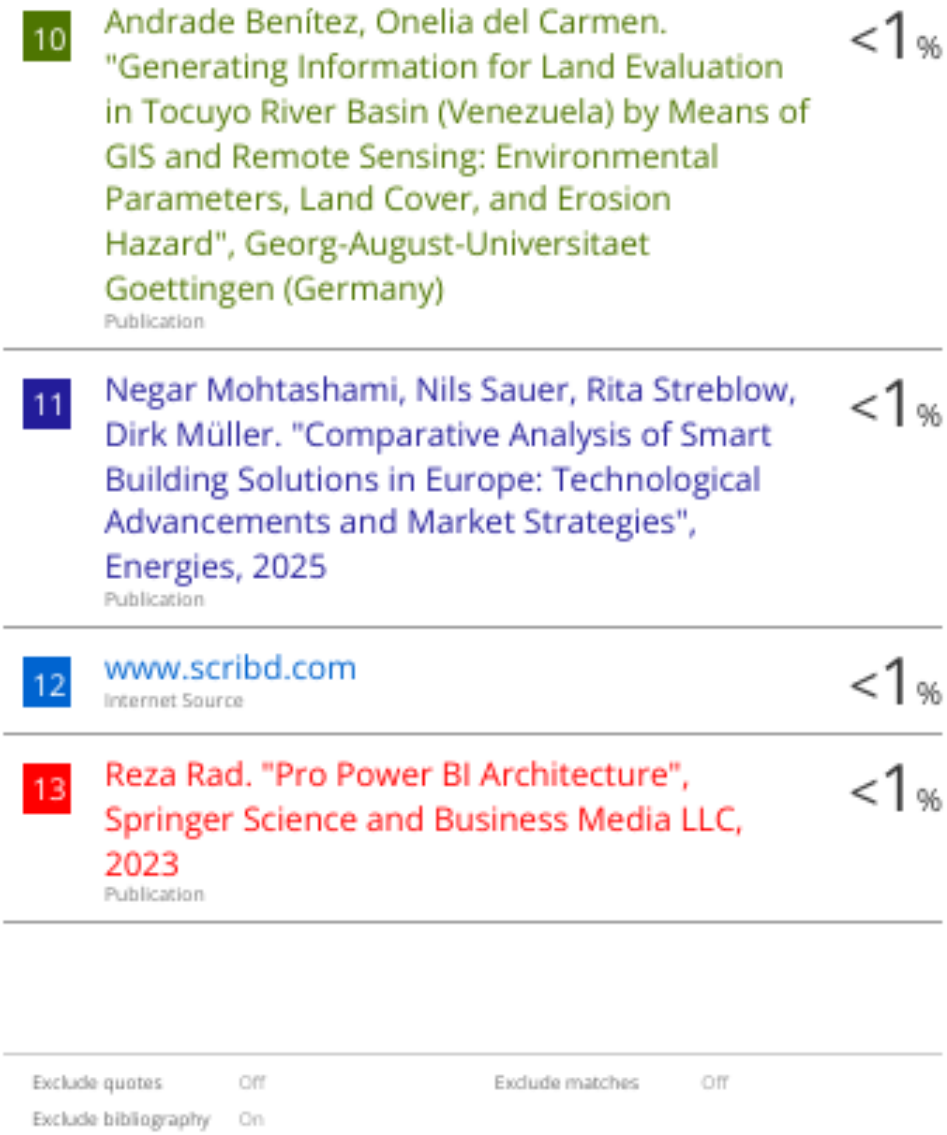
Shet Reshma Prakash - PIP4004_INTERNSHIP REPORT Final (1)

ORIGINALITY REPORT

13%	9%	7%	11%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Presidency University Student Paper	11%
2	quibblerm.com Internet Source	<1%
3	Reza Rad. "Pro Power BI Architecture", Springer Science and Business Media LLC, 2018 Publication	<1%
4	Submitted to Global Banking Training Student Paper	<1%
5	docplayer.net Internet Source	<1%
6	nepis.epa.gov Internet Source	<1%
7	ro.ecu.edu.au Internet Source	<1%
8	ciencia.lasalle.edu.co Internet Source	<1%
9	Piyush Kumar Garg, Roshni Chakraborty, Sourav Kumar Dandapat. "ATSumm: Auxiliary information enhanced approach for abstractive disaster tweet summarization with sparse training data", Knowledge-Based Systems, 2025 Publication	<1%



10	Andrade Benítez, Onelia del Carmen. "Generating Information for Land Evaluation in Tocuyo River Basin (Venezuela) by Means of GIS and Remote Sensing: Environmental Parameters, Land Cover, and Erosion Hazard", Georg-August-Universitaet Goettingen (Germany) Publication	<1%
11	Negar Mohtashami, Nils Sauer, Rita Streblow, Dirk Müller. "Comparative Analysis of Smart Building Solutions in Europe: Technological Advancements and Market Strategies", Energies, 2025 Publication	<1%
12	www.scribd.com Internet Source	<1%
13	Reza Rad. "Pro Power BI Architecture", Springer Science and Business Media LLC, 2023 Publication	<1%

Exclude quotes Off
Exclude bibliography On
Exclude matches Off

SUSTAINALBE DEVELOPMENT GOALS

Mapping the Project "Hotel Hospitality Data Analysis" with Global Sustainability Objectives This project reinforces several United Nations Sustainable Development Goals (UN SDGs) by encouraging digitalization, data effectiveness, innovation, and sustainable hotel management. What follows is an in-depth mapping of applicable SDGs and the ways in which this project adds to them.

Target 8: Decent Work and Economic Growth

- Relevant Target: 8.2 – Encourage productive work, quality job creation, entrepreneurship, innovation and creativity.
- Hotels that implement Power BI can maximize labor planning through trends in occupancy to avoid overstaffing or understaffing.
- Long-term profitability results from data-driven decisions, where job retention and improved working conditions are achieved.
- Automating reports also minimizes labor and increases employees' productivity.

Goal 11: Sustainable Cities and Communities

- Relevant Goal: 11.3 – Improve participatory, integrated and sustainable urban development.
- Hospitality is an integral part of building urban tourism communities.
- Dashboards in real time assist hotels to plan more, serve guests more effectively, and minimize wasteful practices like overbooking or wasting utilities.