**Business Statistics for Decision Making**

**NMIMS Solved Assignments for December 2024**

**1. The management of Jubilant Hotels Pvt. Ltd. was trying to understand what drives the occupancy of the hotel. They identified City Arrivals per day, advance bookings of the hotel and promotional activities of their major competitor (Stellar Hotels) as variables that drive the occupancy of the hotel. They have collected the following data.**

**Table 1: Data Set**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Period** | **Jubilant Occupancy** | **City Arrivals per Day** | **Jubilant Advance Bookings** | **Stellar Promotions (1- Activity conducted; 0 - Activity not conducted)** |
| **Jan-21** | **308** | **2,622** | **200** | **1** |
| **Feb-21** | **471** | **3,189** | **250** | **0** |
| **Mar-21** | **399** | **3,022** | **250** | **1** |
| **Apr-21** | **373** | **3,003** | **175** | **0** |
| **May-21** | **380** | **2,890** | **185** | **0** |
| **Jun-21** | **373** | **3,080** | **180** | **1** |
| **Jul-21** | **484** | **3,418** | **300** | **1** |
| **Aug-21** | **438** | **3,184** | **250** | **0** |
| **Sep-21** | **399** | **2,702** | **250** | **0** |
| **Oct-21** | **477** | **3,358** | **285** | **0** |
| **Nov-21** | **367** | **2,898** | **200** | **0** |
| **Dec-21** | **276** | **2,538** | **170** | **1** |
| **Jan-22** | **315** | **2,499** | **255** | **1** |
| **Feb-22** | **393** | **3,092** | **200** | **0** |
| **Mar-22** | **471** | **3,045** | **300** | **0** |
| **Apr-22** | **419** | **3,019** | **200** | **0** |
| **May-22** | **432** | **2,963** | **240** | **0** |
| **Jun-22** | **438** | **3,312** | **205** | **0** |
| **Jul-22** | **451** | **3,424** | **315** | **1** |
| **Aug-22** | **458** | **3,168** | **265** | **0** |
| **Sep-22** | **406** | **2,852** | **250** | **0** |
| **Oct-22** | **425** | **3,044** | **210** | **1** |
| **Nov-22** | **328** | **2,423** | **260** | **1** |
| **Dec-22** | **295** | **2,640** | **185** | **1** |
| **Jan-23** | **328** | **2,490** | **260** | **0** |
| **Feb-23** | **393** | **3,093** | **300** | **1** |
| **Mar-23** | **419** | **2,948** | **270** | **0** |
| **Apr-23** | **367** | **2,695** | **305** | **1** |
| **May-23** | **386** | **2,797** | **250** | **1** |
| **Jun-23** | **432** | **3,452** | **250** | **0** |
| **Jul-23** | **438** | **3,313** | **275** | **1** |
| **Aug-23** | **471** | **3,217** | **305** | **0** |
| **Sep-23** | **250** | **2,102** | **150** | **1** |
| **Oct-23** | **354** | **2,405** | **280** | **1** |
| **Nov-23** | **282** | **2,238** | **175** | **0** |
| **Dec-23** | **295** | **2,297** | **185** | **1** |

**On the basis of data given in Table 1, find the correlation of Jubilant occupancy with each of the independent variables and comment on the nature and strength of the relationship. Also, run the multiple regression and interpret the resultant Excel summary output in this context with reference to the following:**

* **Adjusted R-square value**
* **Multiple R**
* **ANOVA**

**Answer:**

**Introduction:**

Jubilant Hotels Pvt. Ltd. is analyzing factors that influence hotel occupancy to enhance its business strategy. Identifying key drivers such as City Arrivals per Day, Advance Bookings, and Promotional Activities of its main competitor, Stellar Hotels, is critical for understanding occupancy trends. The collected data spans multiple months, allowing for a comprehensive analysis of how these variables correlate with hotel occupancy rates. By calculating the correlation coefficients, the management can determine the strength and direction of relationships among the variables. Additionally, conducting a multiple regression analysis will provide insights into how well these independent variables explain variations in hotel occupancy. This analysis will also evaluate model fit using metrics such as Adjusted R-squared, Multiple R, and ANOVA, offering a robust understanding of the factors impacting occupancy at Jubilant Hotels.

**This is partially solved sample answer**

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**2. On the basis of the data given in Table 1:**

* **Compute the measures of central tendency of Jubilant Occupancy, City Arrivals per day, and Jubilant Advance Bookings.**
* **Compute the standard deviations of these 3 variables.**
* **Construct the histogram for each of these three variables, and comment on their skewness.**

**Answer:**

**Introduction:**

Jubilant Hotels Pvt. Ltd. aims to enhance its operational strategies by analyzing key performance indicators such as hotel occupancy, city arrivals, and advance bookings. Understanding the measures of central tendency (mean, median, mode) for these variables will provide insights into typical occupancy levels, visitor patterns, and booking behaviors. Additionally, calculating the standard deviations will indicate the variability or dispersion of these data points, which is essential for assessing stability and forecasting. Constructing histograms for each variable will visually represent their distributions, revealing potential skewness and helping identify trends. This analysis will enable management to make informed decisions based on historical data, optimizing resource allocation and marketing strategies to improve occupancy rates. By examining these statistics, Jubilant Hotels can strategically position itself in a competitive market.

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**3. Trusty Automobile Auto Parts & Supplies Ltd. sells a popular brand of engine oil. The firm has been in business for a long period of time. The company policy is to place a reorder with the supplier once the stock level of the engine oil falls to 15 gallons. The Sales Manager is concerned that the company is losing sales as there are frequent instances of stock-outs (no stock available to meet customer demands). The company has observed that the demand during the lead time (the time between placing a reorder with the supplier and receiving the replenishment) is normally distributed with a mean of 12 gallons and a standard deviation of 4 gallons.**

**a. What is the probability of a stock-out? (i.e., demand during lead time exceeding 15 gallons).**

**Answer:**

**Introduction:**

In inventory management, maintaining optimal stock levels is crucial to meet customer demand and avoid stock-outs, which can lead to lost sales and dissatisfied customers. Trusty Automobile Auto Parts & Supplies Ltd. faces challenges with frequent stock-outs of engine oil, prompting the Sales Manager's concern. Understanding the likelihood of stock-outs is essential for effective inventory control. Given that demand during the lead time is normally distributed, calculating the probability of demand exceeding the reorder point of 15 gallons will help the company make informed decisions.

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**b. The sales manager would like to reduce the probability of a stock-out to be no more than 3%. What should the reorder point be (i.e., what should be the existing stock level when the company places a reorder)?**

**Answer:**

**Introduction:**

To ensure customer satisfaction and maintain sales, Trusty Automobile Auto Parts & Supplies Ltd. must effectively manage its inventory levels, particularly for its popular engine oil. The Sales Manager aims to reduce the stock-out probability to no more than 3%, recognizing the need for a strategic adjustment in reorder levels. By determining the appropriate reorder point, the company can align inventory management with demand variability during lead time, ultimately minimizing the risk of stock-outs and enhancing overall operational efficiency.

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