**Assignment 1: Prestige Mall**

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| Class | **MS9001** |

**Case Study: Prestige Mall**

**What businesses have you here?**



One of the shops in this shopping centre, *Prestige Mall*, has become vacant. You were tasked by your boss to suggest a possible tenant to bring into the Mall.

Some decisions that we make may be based on personal judgments but some may not. In this case, a proposal with support from data collected is obviously more convincing as compared to a proposal without such a support or a proposal supported with personal judgments alone. What are some of the information that you would include in your proposal, as support to the kind of business (and thus the potential tenant) that you would like to recommend to your boss?

Well, for instance, you may like to have an initial “feel” of the profile of customers who patronize this mall:

* What kind of job sectors are they from?
* How many times do they frequent Prestige Mall in a month?
* How much do they typically spend in Prestige Mall?
* What is their age profile?
* What is the proportion of male customers of Prestige Mall?
* What is their average monthly household income?

The questions listed above would generate valuable information in helping you to decide on the potential tenant that you would like to recommend to your boss.

You will like a systematic way to approach this problem, thus you use the 4-steps **statistical problem-solving process** that you have been introduced:

Formulating  
Questions

Collecting  
Data

Analysing  
Data

Interpreting  
Results

In order to collect data, a selected group of customers of Prestige Mall is chosen to respond to a survey. By the end of the survey period, you have collected feedback from 200 customers. The data is recorded in the spreadsheet named *PrestigeMall\_Data\_2021S2.xlsx*.

You can refer to Q8 below on how to fill in the fields in the table that is designed in accordance to the 4-steps statistical problem-solving process.

**Instructions**

1. Give your answers in the boxes provided.
2. Refer to *PrestigeMall\_Data\_2021S2.xlsx* and use Minitab to analyze the data.
3. Refer to Annex A to facilitate the identification of suitable charts for Q5 to Q12.
4. Upload this whole completed file into PolyMall (Learning Resources 🡪 ASSIGNMENT 1 (File Submission)).

Q1: What is the aim of this case study? (3 marks)

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| To determine the type of a new tenant that Prestige Mall’s majority spending customers are attracted to. |

Q2: What is the sample of this case study? And what is the targeted population? (2 marks)

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| Target Population: The total number of customers who visit Prestige Mall  Sample Population: Prestige Mall customers who took the survey |

Q3: How were the data collected, as recorded in the data file named “Prestige Mall”? (1 mark)

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| Job sector: *IT/Engineering, Business/ Finance, Other*s  Gender: *Female, Male*  Age, Number of Visits per month, Household income, Amount spent per month: *Any values provided by the respondents* |

Q4: What information (variables) does the data file named “Prestige Mall” hold? (3 marks)

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| Variable data: Job Sector, Age, Visits per Month, Gender, Household Income and Amount Spent per month |

|  |  | **Define variable and type of data** | **Numerical Summaries** | **Graphical Summaries** | **Description of Sample and  Generalization to the target population** |
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| Q5 | What is the proportion of male and female customers of Prestige Mall?  (8 marks) | *Which variable would you use to answer this question?*  Gender  *What type of data are these?*  Qualitative, Nominal | |  |  | | --- | --- | | **Male** | 41% | | **Female** | 59% | |  | ***Describing the sample:***  **For Q5:** Around 59% of the shoppers are female and 41% are male.  **For Q6:**  The majority of the shoppers are from the age of 33 to 52.  **For Q7:**  The average household income is $8230**.**  ***Generalizing to the population* (2 marks) *(Based on Q5-Q7 sample description)*:**  The majority of shoppers are around the age of 33 to 52, with an average income of $8230 and 59% are females. |
| Q6 | What is the age profile of the customers?  (8 marks) | *Which variable would you use to answer this question?*  Age  *What type of data are these?*  Quantitative, Discrete | |  |  | | --- | --- | | **Mean** | 41.96 | | **Median** | 41.5 | | **SD** | 11.86 | |  |
| Q7 | What is the distribution of income of the customers?  (8 marks) | *Which variable would you use to answer this question?*  Household Income  *What type of data are these?*  Quantitative, Continuous | |  |  | | --- | --- | | **Mean** | $8,231.3 | | **Median** | $5,028.60 | | **SD** | $1,222.90 | |  |
| Q8 | What is the proportion of customers in the IT/Eng and Bus/Fin sectors? | *Which variable would you use to answer this question?*  Job Sector  *What type of data are these?*  Qualitative (nominal) | |  |  | | --- | --- | | **Bus/Fin** | 33.5% | | **IT/Eng** | 49% | | **Others** | 17.5% |     **Total Bus/Fin + IT/Eng**  33.5% + 49% = 82.5% |  | ***Describing the sample:***  **For Q8:**  Most of the customers in Prestige Mall are professionals; about 80% are from BUS/FIN and IT/ENG.  **For Q9:** The average number of visits is roughly 4 per month.  **For Q10:** The average amount spent is roughly $500 per month.  ***Generalizing to the population***  **(2 marks)**  ***(Based on Q8-Q10 sample description)*:**  Generally, customers of Prestige Mall are mostly professionals in the BUS/FIN and IT/ENG, with an average of 4 visits a month and spends roughly $400 to $550 per month. |
| Q9 | How often do the customers visit Prestige Mall in the last month?  (8 marks) | *Which variable would you use to answer this question?*  No. of Visits  *What type of data are these?*  Quantitative, Discrete | |  |  | | --- | --- | | **Mean** | 3.49 | | **Median** | 4.0 | | **SD** | 1.742 | |  |
| Q10 | How much did the customers spend last month at Prestige Mall?  (8 marks) | *Which variable would you use to answer this question?*  Amount spent/ Month  *What type of data are these?*  Quantitative, Continuous | |  |  | | --- | --- | | **Mean** | $501.20 | | **Median** | $503.11 | | **SD** | $137.84 | |  |
| Q11 | Is there any preliminary visual evidence to claim that female customers who visited Prestige Mall 6 times last month spent very much more than female customers who visited Prestige Mall only once last month?  (18 marks) | *Which variable would you use to answer this question?*  Gender, No. of Visits/month, Amount spent/ month  *What type of data are these?*  Gender: Qualitative, Nominal  No. of Visits/ Month: Quantitative, Discrete  Amount Spent/ Month: Quantitative, Discrete | Table for Amount spent/ month:   |  |  |  | | --- | --- | --- | |  | Visit mall once/mth | Visit mall  6 times/mth | | *n* | 24 | 21 | | Mean | $468.20 | $492.30 | | SD | $149.90 | $126.10 | | Min | $130.0 | $271.50 | | Median | $453.40 | $489.30 | | Max | $743.80 | $749.50 | | Display a single suitable graphical summary for “Female who visit Mall 1 time” and “Female who visit Mall 6 times” only. | ***Describing the sample:***  Both data sets appear to be quite similar on the average spending per month, deviation, median and max. However, there are three outliers for 1 visit per month, thus affecting the mean spending data. If we remove the outliers, we are able to dictate a better average spend for customers who visits 1 once a month vs 6 visits per month.  ***Generalizing to the population:***  Females who visits 6 times per month spends consistently more than 1 visit per month. |
| Q12 | **Ask a question about the relationship between 2 quantitative variables. Complete the sentence in the box below, then proceed to investigate**  **(9 marks)**  **Is there a relationship between …**   |  | | --- | | Higher amount of household will result in a higher amount spent/ month | | *Which quantitative variables would you use to answer this question?*  Household income and Amount Spent/ month  *What type of quantitative data are these?*  Both data are discrete | Not required for this Assignment. |  | ***Describing the sample:***  The r = 0.035, which is close to 0 indicating there is no correlation between these two variables.      ***Generalizing to the population:***  We can conclude that the household income should not be a factor affected spending amount per month. |

Q13: Based on some or all the interpretations from Q5 to Q12, suggest a potential business to recommend to your boss, and thus a potential tenant. (10 marks)

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| With the findings above, we are able to conclude that the majority shoppers have an average household income of $8,231.29, 4 visits per month and an average spending of $485.83 per month. As we have determine that there is no correlation on the household income vs average spending, we can conclude that the household income should not be a factor to determine the new tenet’s business.  The shoppers user demographics are majority from the age of 33 to 52, about 80% are from BUS/FIN and IT/ENG and 60% are females.  Therefore, I would recommend electronic lifestyle gadgets to be the possible tenant based on the above evaluations. |

Q14: Given a chance to redesign the survey, suggest a possible new question (and thus a new variable) that can be added into the survey to gain more insight on the customers of Prestige Mall. Explain how this variable may affect your recommendation in Q13. (10 marks)

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| **Formulating Question:**  Where do you stay?   * Location A * Location B * Location C * Others:\_\_\_\_   **Collecting Data:**  *What is the name of the variable you would use to answer this question?*  This variable will be called ‘Geo Location’  *What type of data is this?*  Qualitative, Nominal Data collected from the shoppers. However, we are able to get the geographical distance between the shoppers and mall with the data. Thus, the geographical distance will be quantitative and continuous.  **Analyzing Data:**  *What numerical summaries do you need?*  Mean – average distance traveled by the shoppers  Median and IQR – to eliminate the outliers, ie. Random one off shoppers whom does not live in the vicinity of the mall  Correlation – understand does the geographical distance affects the frequency of visits  *What type of graphical summary do you need (i.e. pie chart, bar chart, histogram, boxplot?). Explain why you use this type of graphical summary.*  Scatter plot to understand correlation of visits vs distance.  Histogram to understand the average distance between their home and the mall  Box plot to check if there is any outliers affecting the average of the data, and understanding the range of the distance.  **Explain how this variable may affect your recommendation in Q13.**  **By understanding the geographical distance of the majority shoppers, whom frequent Prestige mall, we are able to determine if the proposed new tenet is suitable for shoppers whom** |

**Annex A**

The flowchart below may be helpful for students to identify a suitable chart to use for a particular question.

