ABC Call Volume Trend Analysis

Project Description:

The project is about the world of Customer Experience (CX) analytics, specifically focusing on the inbound calling team of a company. You'll be provided with a dataset that spans 23 days and includes various details such as the agent's name and ID, the queue time (how long a customer had to wait before connecting with an agent), the time of the call, the duration of the call, and the call status (whether it was abandoned, answered, or transferred).

A Customer Experience (CX) team plays a crucial role in a company. They analyze customer feedback and data, derive insights from it, and share these insights with the rest of the organization. This team is responsible for a wide range of tasks, including managing customer experience programs, handling internal communications, mapping customer journeys, and managing customer data, among others.

In the current era, several AI-powered tools are being used to enhance customer experience. These include Interactive Voice Response (IVR), Robotic Process Automation (RPA), Predictive Analytics, and Intelligent Routing.

One of the key roles in a CX team is that of the customer service representative, also known as a call centre agent. These agents handle various types of support, including email, inbound, outbound, and social media support.

Inbound customer support, which is the focus of this project, involves handling incoming calls from existing or prospective customers. The goal is to attract, engage, and delight customers, turning them into loyal advocates for the business.

Approach:

My first approach is to extract & transform methodology on the dataset provided and follow the below steps.

- The data needs to be cleaned, formatted like removing duplicate values and to check if there are any missing values in the dataset. If there are, decide on the best strategy to handle them.
- After cleaning Perform relevant descriptive statistic calculations to gain a general understanding of dataset.
- This could involve calculating averages, medians, or other statistical measures. It could also involve creating visualizations to better understand the data.

Tech-Stack Used:

I used Microsoft Excel version(Microsoft Office Home and Student 2021) . It provides various tools for organising data, including sorting, filtering, and searching. It is easier to find and analyse specific data points quickly.

Also it has various mathematical functions and formulas that can perform complex calculations and comments on data sets. These functions can summarise data, perform statistical analysis, and more.

Insights:

- The dataset has total 117988 records and having 13 columns.
- In the data we could also see 34198 records are N/A's, while analysing them majority were due to Abandoned Calls.
- These N/A values present in "Agent_Name" & "Agent_ID" columns, which are not necessary features for analysis. These can be either deleted or keep it as it is. So I keep it as it is.
- Also there are missing values in "Wrapped _By" column which is also not playing any important role in Analysis. So I keep it as it is as it won't hamper in Analysis.

Analysis:

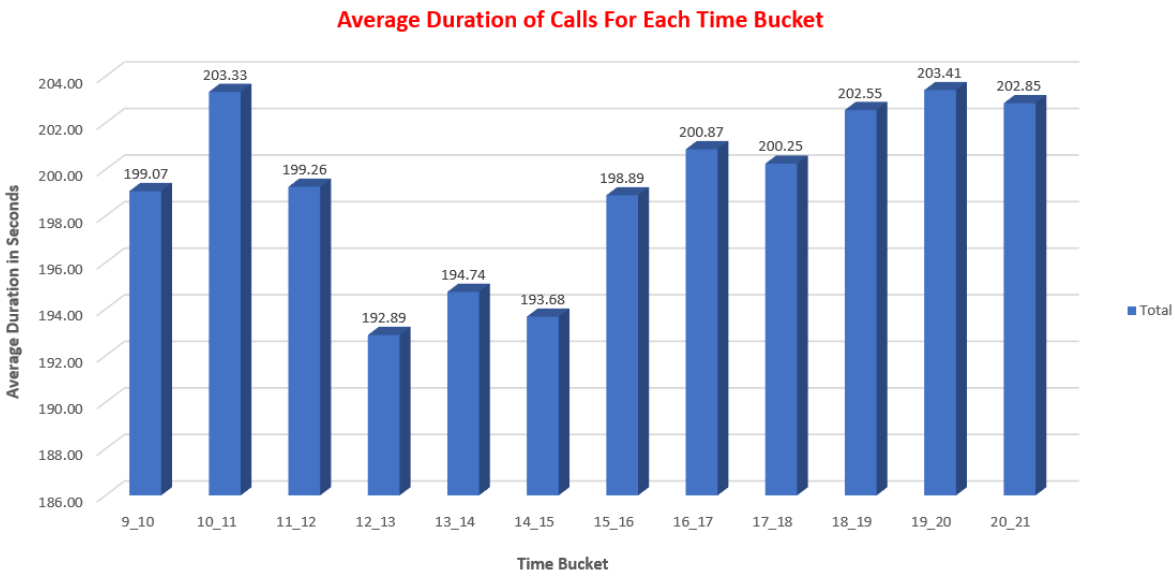
1. **Average Call Duration:** Determine the average duration of all incoming calls received by agents. This should be calculated for each time bucket.

   Your Task: What is the average duration of calls for each time bucket?

   - In this task we used pivot table to get the average duration of calls.
   - Where we put Time_Bucket in Rows, Call_Seconds (s) in values and Call_status in Filter so that we can select only Answered calls among all other categories in Call_status
   - Also we calculated Average seconds by using Value Field settings in Pivot table and select Average in Summarize value field by to get the average seconds for each time bucket.
   - Also plotted clustered bar chart to see the Distribution of Average Duration in each time bucket.

Time Bucket	Average of Call_Seconds (s)
9_10	199.07
10_11	203.33
11_12	199.26
12_13	192.89

13_14	194.74
14_15	193.68
15_16	198.89
16_17	200.87
17_18	200.25
18_19	202.55
19_20	203.41
20_21	202.85
Grand Total	**198.62**



Result: We can see the average duration of call in 19-20 time bucket is high i.e. 203.33. Followed by 10-11 & 20-21 buckets 203.41 & 202.55 respectively.

The total average duration of calls received by agents is **198.62.**

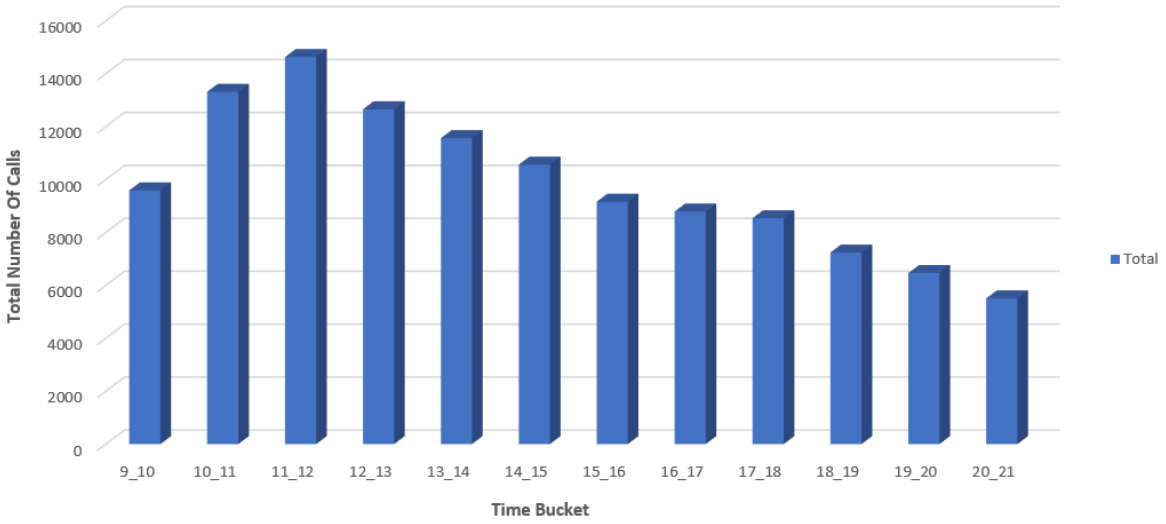
2. **Call Volume Analysis:** Visualize the total number of calls received. This should be represented as a graph or chart showing the number of calls against time. Time should be represented in buckets (e.g., 1-2, 2-3, etc.).

   Your Task: Can you create a chart or graph that shows the number of calls received in each time bucket?

- We used Pivot table to calculate the number of incoming calls in each time bucket, where we take Time_Bucket in Rows and the Customer_Phone_No in Values which automatically gives the count of phone numbers for incoming calls.

Time Bucket	Count of Customer_Phone_No
9_10	9588
10_11	13313
11_12	14626
12_13	12652
13_14	11561
14_15	10561
15_16	9159
16_17	8788
17_18	8534
18_19	7238
19_20	6463
20_21	5505
Grand Total	**117988**

The Number of Calls Received in Each Time Bucket



Result: The majority of incoming calls coming in 11-12 bucket 14626.

3. **Manpower Planning:** The current rate of abandoned calls is approximately 30%. Propose a plan for manpower allocation during each time bucket (from 9 am to 9 pm) to reduce the abandon rate to 10%. In other words, you need to calculate the minimum number of agents required in each time bucket to ensure that at least 90 out of 100 calls are answered.

   Your Task: What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%?

Assumptions	
Agents working hour	**9**
Agents on-floor work hour	**7.5**

Working Days	**6**
Total Working days	**25**
Unplanned leave days	**4**
Work days per month	**21**
Days an agent work in a week	**5**
Total actual working hours (i.e., 60% of 7.5 hours)	**4.5**

Call Status	Count of Customer_Phone_No
abandon	29.16%
answered	69.88%
transfer	0.96%
Grand Total	**100.00%**

- As we can see the above pivot table shows 29.16% calls are abandoned and 69.88% calls are answered and 1% calls are transferred.
- We then calculated the Average Time Taken to Answer the call in Sec is **196.96**, it is the Average total duration among answered & transfer categories in Call_status.
- Then we calculated the Average Daily Call Volume by using Pivot table, where we used Date&Time in Rows, Call_status in Columns.
- We used the AVERAGE function in excel to calculate the average calls in all categories per below.

Call Status	Grand Total	Average
abandon	34403	**1496**
answered	82452	**3585**
transfer	1133	**49**
Total	117988	**5130**

- Average Daily Call Volume is 5129.91 by Rounding off 5130.
- Then we calculated Average Time Required To Answer 90% of the calls by using Average Daily Call Volume * by Average Time taken to answer call * 90% /3600

- 5129.91*196.96*0.9/3600 = 252.60 hrs.
- We get 252.60 total hours for 90% calls to answer.
- After that we calculated Total working person required per day. this we get by using above the Average Time Required To Answer 90% of the calls divided by Total actual working hours.
- 252.60 /4.5 = 56.14 which is Rounded of 56.
- As we get 56 agents to manpower the 90% of abandoned calls.

Distribution of Required agents in each time bucket:

Time Bucket	Time Distribution in %
9_10	8.13%
10_11	11.28%
11_12	12.40%
12_13	10.72%
13_14	9.80%
14_15	8.95%
15_16	7.76%
16_17	7.45%
17_18	7.23%
18_19	6.13%
19_20	5.48%
20_21	4.67%
Grand Total	**100.00%**

- Now that we have total agents required to reduce the abandoned calls to 10%, so we will see the distribution of these required agents in each time bucket.
- We used Pivot table to see the time distribution for each time bucket in percentage by using Time_bucket in Rows and Duration in values and changed the values in percentage by using Value Field Settings. And changed the column names.
- After that we created a column beside Time Distribution to see the Distribution of Required agents in each time bucket by multiplying Total required agent i.e. 40 and Time distribution of each time bucket

- like 8.13% which is 0.0813 * 56 = 4.55 by rounding of 5. And did the same with other buckets and get the below distribution for each.

Time Bucket	Time Distribution %	Required Agents for 90% Calls
9_10	8.1%	5
10_11	11.3%	6
11_12	12.4%	7
12_13	10.7%	6
13_14	9.8%	6
14_15	9.0%	5
15_16	7.8%	4
16_17	7.4%	4
17_18	7.2%	4
18_19	6.1%	3
19_20	5.5%	3
20_21	4.7%	3
Grand Total	100%	56

4. **Night Shift Manpower Planning:** Customers also call ABC Insurance Company at night but don't get an answer because there are no agents available. This creates a poor customer experience. Assume that for every 100 calls that customers make between 9 am and 9 pm, they also make 30 calls at night between 9 pm and 9 am. The distribution of these 30 calls is as follows:

Your Task: Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

- We already calculated the Average Daily Call Volume which is 5130 & Average Time Taken to Answer the call in Sec 196.96.
- Since 30% of the calls made at night, so the calls at night are 5130*0.3 = **1539.**
- And the additional hours required for these calls with 10% abandoned rate is
- 1539*196.96*0.9/3600 = 76 hrs.
- Now the Total agents required in Night Calls are 76/4.5 = 16.88 Rounded off to 17.

Distribution of Required agents in each time bucket:

Distribution of 30 calls coming in night for every 100 calls coming in between 9am - 9pm (i.e. 12 hrs slot)											
9pm- 10pm	10pm - 11pm	11pm- 12am	12am- 1am	1am - 2am	2am - 3am	3am - 4am	4am - 5am	5am - 6am	6am - 7am	7am - 8am	8am - 9am
3	3	2	2	1	1	1	1	3	4	4	5

The distribution of the calls for each time bucket is already provided per below, so we just calculated it in percentage to see the distribution of these 12 agents in each time bucket of Night calls.

Time Bucket (9pm-9am)	Calls Distribution	Time Distribution in %	Required Agents in Night
21_22	3	0.10	2
22_23	3	0.10	2
23_00	2	0.07	1
00_1	2	0.07	1
1_2	1	0.03	1
2_3	1	0.03	1
3_4	1	0.03	1
4_5	1	0.03	1
5_6	3	0.10	2
6_7	4	0.13	2
7_8	4	0.13	2
8_9	5	0.17	3
Grand Total	30	100%	17

Result:

In this project I learnt how a staffing plan in a company can affect their productivity and customer satisfaction. So as a Data Analyst we can strive through the problem statements and gain domain knowledge about customer service team and deriving useful insights from the analysis.
