ABC Call Volume Trend Analysis

Final Project-4

Project Description :
 In ABC call volume Trend Analysis project we have a dataset of a Customer Experience (CX) Inbound calling team for 23 days. Data includes Agent_Name, Agent_ID, Queue_Time [duration for which customer have to wait before they get connected to an agent], Time [time at which call was made by customer in a day], Time_Bucket , Duration [duration for which a customer and executives are on call, Call_, call status (Abandon, answered, transferred). I used my statistical knowledge and founded several type of insights from the data which helped the hiring team.

Approach :
I carefully understood the requirements and looked what actual data the team needs and then performed data cleaning   in excel and use some excel command to derive meaningful insights. Also used some business analytical perspective mentioned in the project description.

Tech-stack Used :
Excel by Microsoft Corporation – For carrying out EDA on the datasets & Visualisation.

WordPad by Microsoft Corporation – For creating the project report.

Insights :
Performed several excel formulas to get the insights from the data and able to understood that how to perform a real time data analysis in Excel.

Case Study Objectives :

1. Calculate the average call time duration for all incoming calls received by agents (in each Time_Bucket).
   It can be seen that the average call duration increases from 9 to 5 and then decreases.
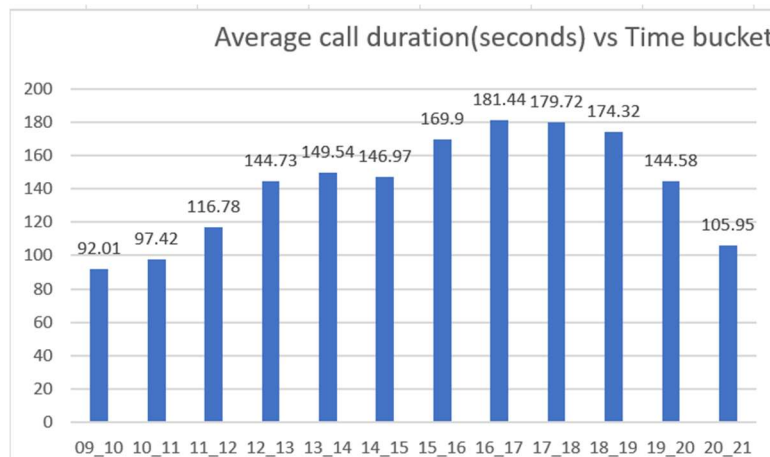
2. Show the total volume/ number of calls coming in via charts/ graphs [Number of calls v/s Time]. You can select time in a bucket form (i.e. 1-2, 2-3, ...)

Solution : It can be seen that the Number of calls in a day increases from 9 to 12 and then it starts decreasing.
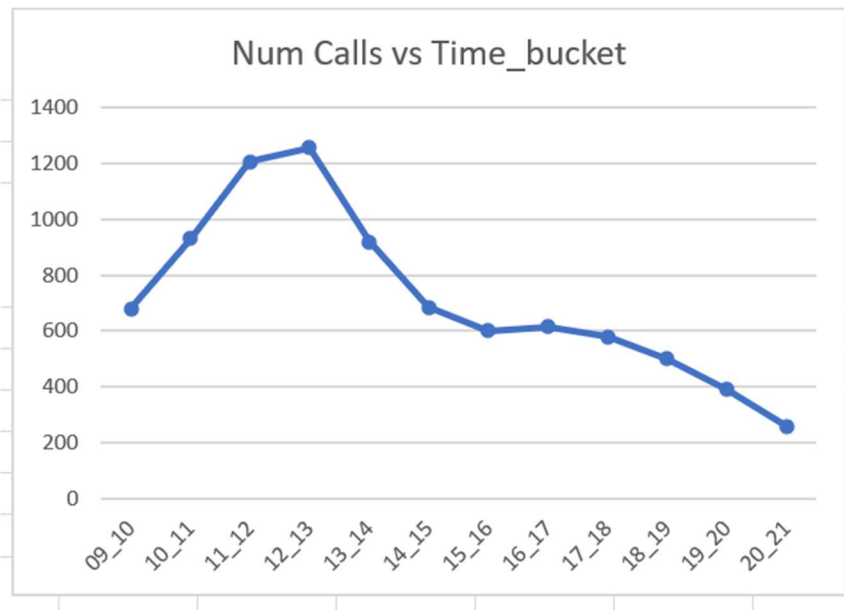
C . As you can see current abandon rate is approximately 30%. Propose a manpower plan required during each time bucket [between 9am to 9pm] to reduce the abandon rate to 10%. (i.e. You have to calculate minimum number of agents required in each time bucket so that at least 90 calls should be answered out of 100.)

Solution : It can be seen that out of 34403 calls dropped, 34198 calls have not been answered by anyone. This can also mean that the agents were busy in any other calls and so, they were unable to tend to these calls. This means that we need to increase the man power to reduce the drop rate.

Agent_Name	abandon	answered	transfer
Grand Total	34403	82452	1133

It can be inferred that the abandon rates are high on particular times of a day and lowest on a particular time in a day. Even though the calls are low during the 9_10 bucket, the drop rate is very high. We have the average call duration in each time bucket. Using that, we can calculate approximately how much time the call center agents are spending talking to the customers in total in a particular time bucket. By using that data, we can arrive at the approximate number

of agents required to have a drop rate lesser than 10 %. It can also be seen that the time buckets in which the avg call duration is high and avg queue time is low have lesser drop rates. Note: A tolerance level needs to be added in every calculation to account for the errors.

Time_Bucket	COUNTUNIQUE of Agent_ID	Abandon Rate	Calls Each Day
09_10	42	53.70%	420
10_11	51	51.91%	580
11_12	59	41.21%	640
12_13	60	24.29%	550
13_14	58	22.64%	500
14_15	60	23.44%	460
15_16	58	13.25%	400
16_17	58	8.50%	380
17_18	58	9.18%	370
18_19	59	12.89%	310
19_20	52	28.59%	280
20_21	27	47.68%	240
Grand Total	**66**	**29.16%**	**5,130.00**

Time_Bucket	9 Shift	10 Shift	12 Shift	Agents Req	Agents Req Calculated
09_10	50	0	0	50	44.88
10_11	50	20	0	70	64.04
11_12	50	20	0	70	73.96
12_13	25	10	40	75	62.65
13_14	0	20	40	60	58.47
14_15	50	0	20	70	53.57
15_16	25	20	40	85	48.84
16_17	50	20	0	70	47.6
17_18	50	10	20	80	46.01
18_19	0	20	30	50	39.48
19_20	0	0	40	40	34.78
20_21	0	0	30	30	26.58

Agents Required is calculated by using the formula Agents Req Calculated = 1.1 * calls Each Day * 2 * (avg call duration + avg queue time) where 1.1 and 2 are tolerance of no of calls and waiting time respectively. So the total man power required = 9 AM shift + 10 AM Shift + 12 PM Shift = 50 + 20 + 40 = 110 New Manpower to be added = req man power - available employees = 110 - 66 = 44 It is advised to add 44 new employees to reduce the abandon rate from 30 % to 10 %

4. Let's say customers also call this ABC insurance company in night but didn't get answer as there are no agents to answer, this creates a bad customer experience for this Insurance company. Suppose every 100 calls that customer made during 9 Am to 9 Pm, customer also made 30 calls in night between interval [9 Pm to 9 Am] and distribution of those 30 calls are as follows:

Time_Bucket	9_10	10_11	11_12	12_13	13_14	14_15	15_16	16_17	17_18	18_19	19_20	20_21
Calls In Night	2876	3994	4388	3796	3468	3168	2748	2636	2560	2171	1939	1652

Now propose a manpower plan required during each time bucket in a day. Maximum Abandon rate assumption would be same 10%.

Solution : Men required can be calculated from the same formula given in the previous slide. For the night calls too, men required can be found from the same formula. Calls/ day can be found from the data for the whole 24 hours. A shift plan has been drafted in which the required number of agents in that specific period of time has been used to carefully decided based on the expected number of calls along with some tolerance.

Time Bucket	Men Required	Total Men	8 AM Shift	5 PM Shift	2 AM Shift
08_09	42.93	80	60	0	20
09_10	44.88	90	70	0	20
10_11	64.04	70	70	0	0
11_12	73.96	70	70	0	0
12_13	62.65	60	60	0	0
13_14	58.47	60	60	0	0
14_15	53.57	60	60	0	0
15_16	48.84	50	50	0	0
16_17	47.60	50	50	0	0

5 AM Shift :

Time Bucket	Men Required	Total Men	8 AM Shift	5 PM Shift	2 AM Shift
17_18	46.01	50	0	50	0
18_19	39.48	50	0	50	0
19_20	34.78	50	0	50	0
20_21	26.58	50	0	50	0
21_22	25.76	25	0	25	0
22_23	25.76	25	0	25	0
22-00	17.17	50	0	50	0
00_01	17.17	50	0	50	0
01_02	8.59	70	0	50	20

2 AM Shift :

Time Bucket	Men Required	Total Men	8 AM Shift	5 PM Shift	2 AM Shift
02_03	8.59	70	0	50	20
03_04	8.59	20	0	0	20
04_05	8.59	10	0	0	10
05_06	8.59	10	0	0	10
06_07	25.76	20	0	0	20
07_08	34.34	20	0	0	20
08_09	34.34	20	0	0	20
02_03	42.93	80	60	0	20
09_10	44.88	90	70	0	20

So, the total number of man power needed is 8 AM shift + 5 PM Shift + 2 AM Shift = 70 + 50 + 20 = 140. After hiring 140 - 66 = 74 agents, we can expect the call abandon rates to lesser than 10 %.

Result :

Performed all the analysis in Microsoft Excel using pivot tables and charts to create actionable insights to make data driven decision.

Please refer all sheets in Call_Volume_Trend_Analysis.xlsx for all pivot tables and analysis in Drive folder.