ABC Call Volume Trend Analysis

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Description:

So for the final project, I was provided with a dataset of a Customer Ex. (CX) inbound calling team for 23 days. Data included a lot of columns like: Agent_Name, Agent_ID, Queue_Time, Time, Time_Bucket, Duration, Call_Seconds, Call_Status etc. My role as a Data Analyst is to understand the data provided and find when is the maximun number of calls are made during the day and how can I improve the overall CX by reducking the amount of declined calls percentage.

So, as a Analyst I have to answer the questions as questioned and analyse how many agents are needed to decrease the percentage of declined calls.

Approach:

So first I read all the columns and after having some understanding about the data, I created a table and checked all the datatypes. Few columns were not needed but I did not delete those columns as the data was not so huge.

My next task was simple to answer all the questions, I used pivot tables for answering few questions while I also created bar graphs for the purpose of better visualisations and understanidings. I also had to use basic maths and functions like round() to answer questions.

Lastly, I created the report and wrote the insights.

Tech-Stack Used: Ms Excel for the purpose of answering the questions, making pivot tables and visualisations. And Ms Word, for reporting and writing usefull insights.

Case Study Objectives:

a. Calculate the average call time duration for all incoming calls received by agents (in each Time_Bucket).

Row Labels	Average of Call_Seconds (s)
9_10	199.0691057
10_11	203.3310302
11_12	199.2550234
12_13	192.8887829
13_14	194.7401744
14_15	193.6770755
15_16	198.8889175
16_17	200.8681864
17_18	200.2487831
18_19	202.5509677
19_20	203.4060725
20_21	202.845993
Grand Total	198.6227745
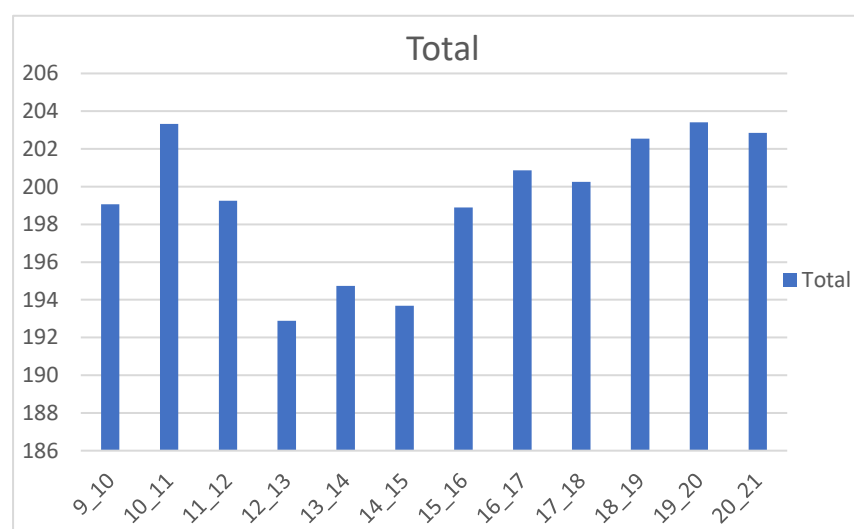
Insights:

I put time_bucket on the x-axis and number of average calls seconds on the y-axis and call_status in the filter with the help of which I filtered all the answered calls only.

Calls were answered most in the time_bucket 19_20 followed by 10_11. That means, 7pm – 8pm followed by 10am – 11am. While least amount of calls were answered in the noon ie. 12pm – 1pm followed by 2pm – 3pm. Calls increases in the evening and there's a dip in the afternoon. Which signifies that the peak time is in the evening while afternoon is the off-peak time.

b. 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, ...)

| Row Labels	Count of Customer_Phone_No	Count of Time_Bucket
9_10	9588	8.1%
10_11	13313	11.3%
11_12	14626	12.4%
12_13	12652	10.7%
13_14	11561	9.8%
14_15	10561	9.0%
15_16	9159	7.8%
16_17	8788	7.4%
17_18	8534	7.2%
18_19	7238	6.1%
19_20	6463	5.5%
20_21	5505	4.7%
Grand Total	117988	100.0%
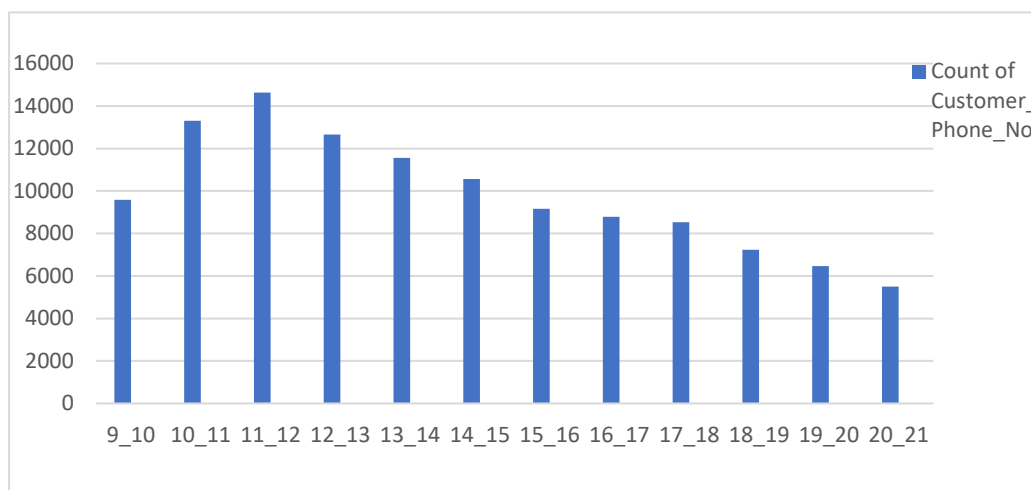
Insights:

So I plotted time_bucket on the x-axis, count of customer phone number on y-axis to count the total number of calls made. It is visible that the most calls are made during 11-12 time_bucket followed by 10-11 and 1pm – 2pm respectivelly that means this is the time where most customer engagement is done.

Calls decreases after noon ad the day progresses further and least amount of user engagemnet is seen at the time_bucket 8pm – 9pm.

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.)
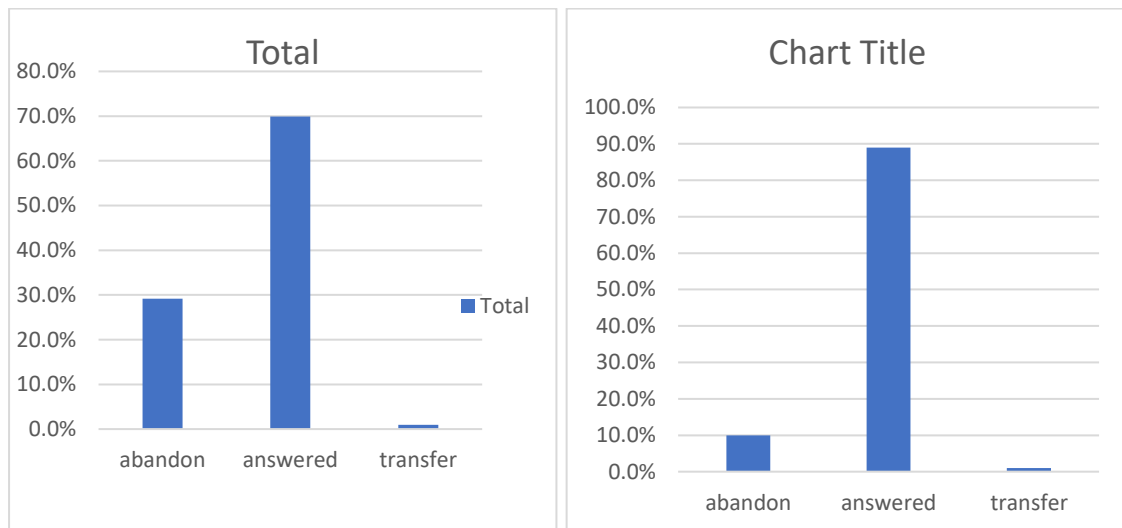
Insights:

The above two visualisations show what is the current abandoned calls percentage and what is the abandoned calls percentage we want.

Row Labels	Sum of Call_Seconds (s)	Count of Call_Seconds (s)2	AGENTS_NEEDED
9_10	35313	7.73%	5
10_11	53087	11.89%	7
11_12	67751	10.49%	7
12_13	72680	10.10%	6
13_14	59693	8.03%	5
14_15	76137	9.32%	6
15_16	65689	7.90%	5
16_17	59464	7.13%	4
17_18	68155	8.01%	5
18_19	53096	7.26%	4
19_20	40141	5.06%	3
20_21	25458	7.08%	4
Grand Total	676664	100.00%	62

SUM_OF_CALL_DURATION_IN_SECONDS		676664
SUM_OF_CALL_DURATION_IN_HOURS	676664/3600	187.9622222
ACTUAL_WORK_HOURS	(7.5*60)/100	4.5
T_WORKERS	187.96/4.5	41.76938272
		41
T_WORKERS_NEEDED	(90*41)/60	61.5
		62

AGENTS_NEEDED

Insights:

On the x-axis is the time_buckets and on the y-axis is the number of agents needed.

With the help of above table and bar-graph it is visible how many agents are required on what time-slot frames. Maximum amount of agents are needed in the morning ie. 10-11 and 11-12 time-slots, followed by 12pm – 1pm and 2pm – 3pm respectively.

It was assumed that only 60% of 7.5 hrs is the actual working hours. So to find the actual working hours I multiplied 7.5 amd 60 and divided by 100 which equals to 4.5 hrs.

And since the total working seconds is 676664(I chose first day of the month and assumed it is the average), which is divided by 3600 to convert into hours which equals to 187.96.

Now, to find the total number of workers present, I divided 187.96 by 4.5 which is total working hours and actual working hours of a single agent, it equals to 41.7

Since, the number of people can't be in decimal, I assumed it to be 41.

Now, I found that 41 people work in total tha give 30% abandoned ratio, that means that, 41 people answer 70% of the calls but we need it to increase by 90%, for that I used unitary formula and found that total 62 workers are needed.

That means, we need 21 more people to decrease the abandoned calls percentage from 30% to 10%.

d. 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:

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

TIME_DURATION	CALLS
9_10	3
10_11	3
11_12	2
12_1	2
1_2	1
2_3	1
3_4	1
4_5	1
5_6	3
6_7	4
7_8	4
8_9	5

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

AVERAGE_CALLS_DAILY		5129.913
30%OF_AVERAGE_CALLS	(5129.9*30)/100	1538.974
AVERAGE_CALLS_DURATION	(From Question 1)	198.6228
ADD._HRS_NEEDED	(1539*198.6*90)/(100*3600)	76.41882
AGENTS_REQD	76.419/4.5	16.98196
		17

TIME_DURATION	CALLS	AGENT_REQD2
9_10	3	2
10_11	3	2
11_12	2	1
12_1	2	1
1_2	1	1
2_3	1	1
3_4	1	1
4_5	1	1
5_6	3	2
6_7	4	2
7_8	4	2
8_9	5	3

AGENT_REQD2
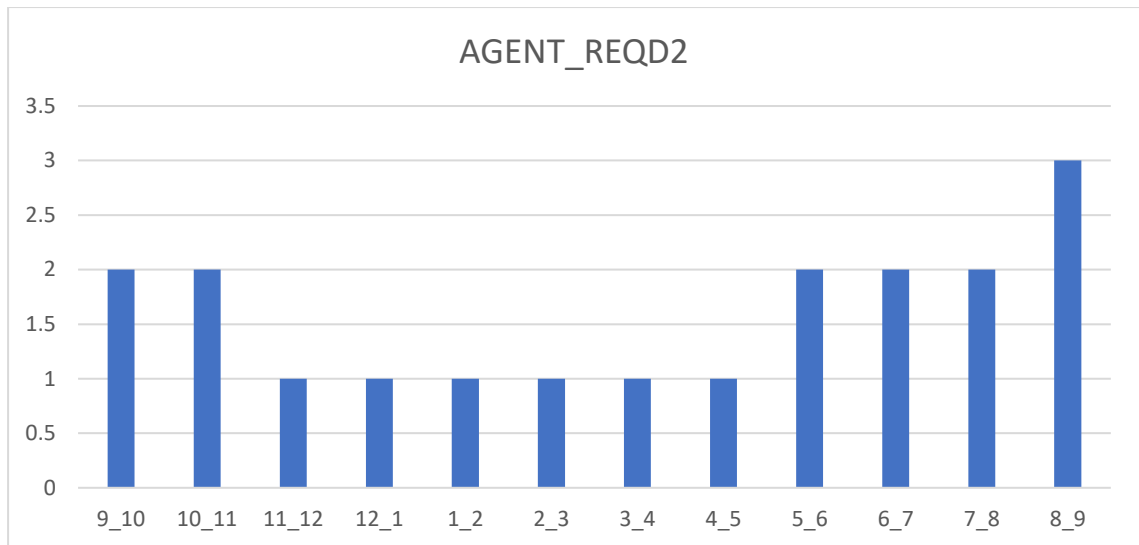
Assumption: An agent work for 6 days a week; On an average total unplanned leaves per agent is 4 days a month; An agent total working hrs is 9 Hrs out of which 1.5 Hrs goes into lunch and snacks in the office. On average an agent occupied for 60% of his total actual working Hrs (i.e 60% of 7.5 Hrs) on call with customers/ users. Total days in a month is 30 days.

Insights:

Total 19 agents are needed in the night for answering the night calls.

It is observed that most of the calls in the night shift are made in the early morning that is, 8am – 9am followed by 9-10, 10-11, 5-6, 6-7 and 7-8 respectively.

To find the total number on work force that is needed for the night, I first found that on average 5130 calls are made.

It was given in the question that out of that 30% are made in the night so I simply divided 5130 by 100 and multiplied by 30, which equals to 1539 calls. So, 1539 calls are made in the night.

I also already know that 198.6 is the average call duration, so I then multiplied 1539 to average calls duration and 0.9(since I want 90% answered) and finally divided that by 3600(to convert it into hours), which equals to 76.41.

So, 76.41 hours for the night. Simply I divided 76.41 by 4.5 to find the number of agents required for the night. It was 17 but since people can't be in decimal and after using the round() function, I found that I need total 19 people in the night to attend the calls.

Result:

I realised that as a Data Analyst, I have to understand data and report but it is not just limited to visualisations but one also needs to have understanding of maths and statistics.

I also understood how for any company UX is so crutial and that's a part which can't and should'n be ignored.

Conclusions:

CX is very important for any company and the role of a data analyst to analyse and make sure to provide with the necessary workforce details is necessary.

There are multiple ways that can ensure a customer's satisfaction and multiple tools available as well like suggestion boxes where customer's can mail their issues or post about it on their official websites or a CRM tool, taking surveys, analysing business behaviour etc.

While the average call_seconds increases as the day progress with 10-11 being the heighest, the average number of calls decreases as the day progresses.

This means that the duration of calls are less in the evening and hence more calls can be made but as the day progresses, the duration of calls increases and hence with the progression, calls are less.

Average call_seconds is 198.6227745 qhich we found in question 1.

Even though agents work for total 7.5 hrs, only 60% is the actual working hours that sums up to, 60% of 7.5 hrs, which equals to 4.5 hrs. Hence, 4.5 hrs is the actual working hours. And after calculating it waas observed that 30% calls are declined and to decrease that percentage to 10, we need total 62 agents as the answer was calculated in decimals (ie 61.5 but it can't be in decimal).

We already had 41 people so we will need 21 more people to decrease the abandoned calls percentage to 10.

As for the last question, since it was mentioned thaat if 100 calls are made overall in a single day then 30 calls are made during night that means 30% calls are made during night-time so to deal with the night calls, we will require 19 people.