

ABC Call Volume Trend Analysis

Final Project-4

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Project Description:

The given data set consists 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 [for easiness we have also provided you with the time bucket], Duration [duration for which a customer and executives are on call, Call_Seconds [for simplicity we have also converted those time into seconds], call status (Abandon, answered, transferred).

Let's look at some of the most impactful AI-empowered customer experience tools you can use today:

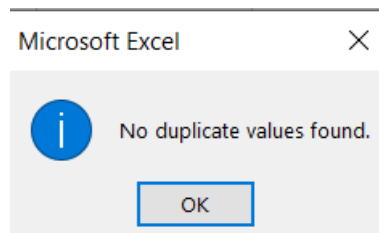
Interactive Voice Response (IVR), Robotic Process Automation (RPA), Predictive Analytics, Intelligent Routing.

In a Customer Experience team there is a huge employment opportunity for Customer service representatives A.k.a. call center agents, customer service agents. Some of the roles for them include: Email support, Inbound support, Outbound support, social media support.

To do this analysis we will first understand the given data and the problems we are going to deal during the process. To decrease the number of abundant calls we are going to find the minimum number of agents to be recruited. The number of new recruits may change according to initial assumptions.

Approach:

As we see in the data there are multiple N/A values in the Agent name and Agent ID we are not going to deal with these values and there are no other blank values. We also checked for the duplicate values, which we were not able to find.



After this we are going to deal with the given tasks by using Pivot tables, Pivot Charts and Excel Functions to arrive to the obtained results.

Tech-Stack Used: I have used

1. Microsoft Excel Professional Plus 2016.
2. Microsoft Word 2016.

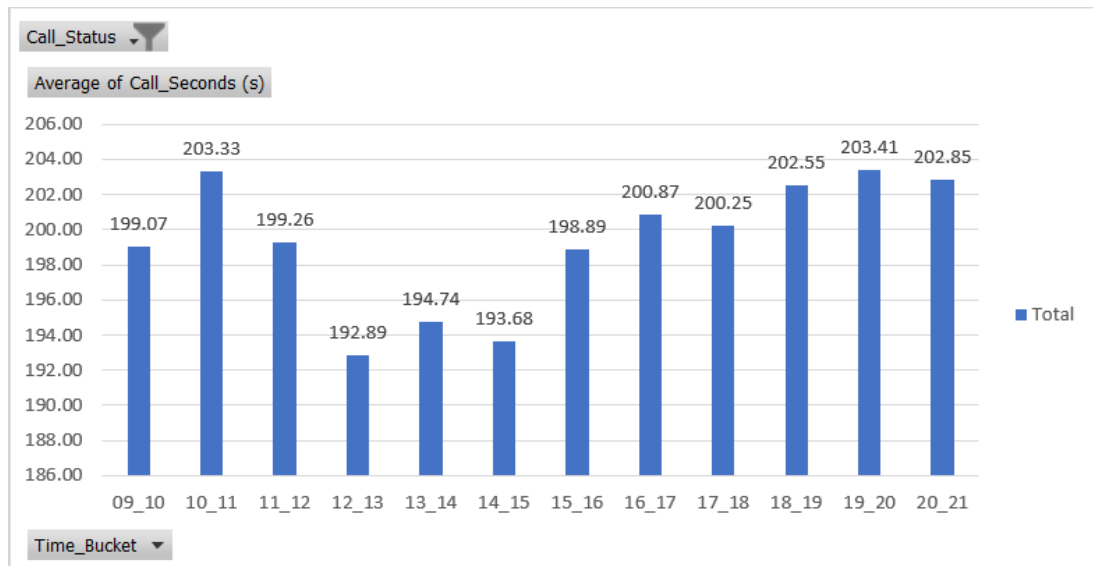
Insights: Let us look at the Insights we gathered during the process.

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

To calculate the Average time, we have inserted the Pivot table. We have taken Time bucket in the rows and average Call seconds in the values along with the call status in the filter section.

Arranging the filter to answered calls we have got the below table and chart.

Call_Status	answered
Row Labels	Average of Call_Seconds (s)
09_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

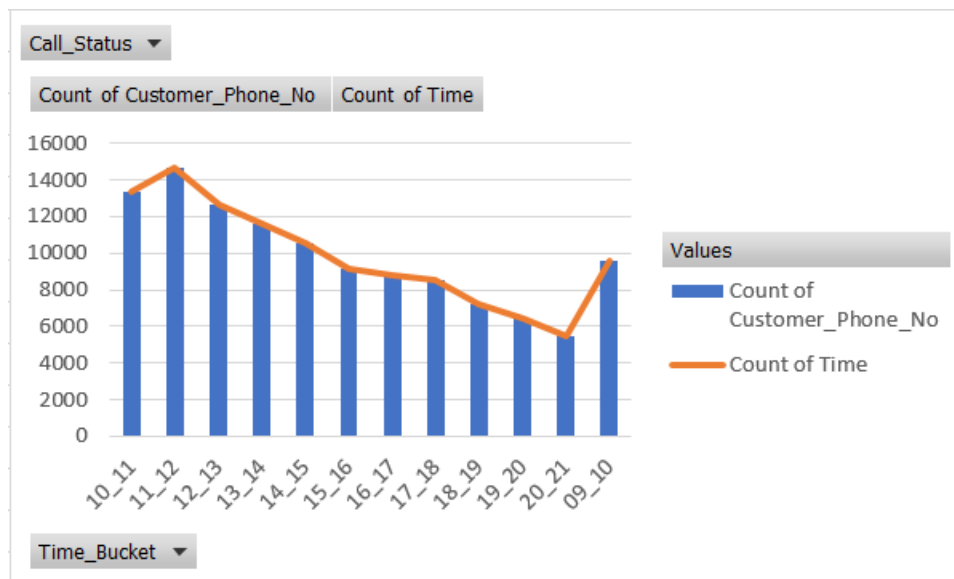


- The time interval from 12-1 p.m. has the least average of call in seconds.
- The time interval from 10-11 am and 7-8 pm has the maximum call in seconds.
- The number of agents may be distributed accordingly.

- 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,)

To know the total volume/ number of calls we have used pivot table, where the Time_Bucket is used in rows and count of Customer_Phone_No and count of time in Values. We also added the filter of Call_Status to understand the distribution better

Call_Status	(All)	
Row Labels	Count of Customer_Phone_No	Count of Time
10_11	13313	13313
11_12	14626	14626
12_13	12652	12652
13_14	11561	11561
14_15	10561	10561
15_16	9159	9159
16_17	8788	8788
17_18	8534	8534
18_19	7238	7238
19_20	6463	6463
20_21	5505	5505
09_10	9588	9588
Grand Total	117988	117988



- As we can see the relation is a normal distribution which is right skewed.
- Time interval from 11 am-12 pm receives highest number of calls.
- Time interval 8-9 pm receives least number of calls.

- 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.)

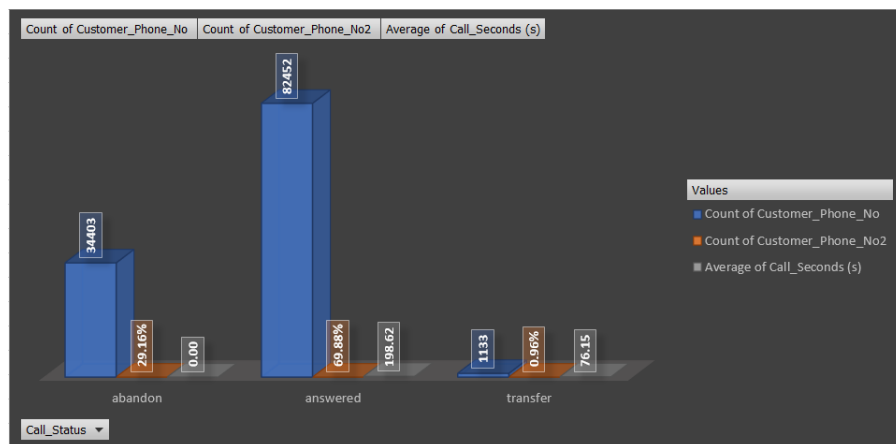
Assumption: An agent work for 6 days a week; On an average total unplanned leaves per agent is 4 days a month; An agent total working hrs is 9 Hrs out of which 1.5 Hrs goes into lunch and snacks in the office. On average an agent occupied for 60% of his total actual working Hrs (i.e. 60% of 7.5 Hrs)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

Total working hours is (9-6)	9 hours
Lunch break	1.5 hour
Actual working time	7.5 hours
out of 30 days agent works for	26 days
Unplanned holidays and leaves	4 days
Working days per month	22
days an agent works in a week is	5.13333
Actual working hours	60%
Total time spent on call	4.5

The below table is created using pivot table. We have taken Call_Status on the rows and the Coustomer_Phone_No, Call seconds in the values. Coustomer_Phone_No is taken twice as we need both count and the percentage.

Row Labels	Count of Customer_Phone_No	Count of Customer_Phone_No2	Average of Call_Seconds (s)
abandon	34403	29.16%	0.00
answered	82452	69.88%	198.62
transfer	1133	0.96%	76.15
Grand Total	117988	100.00%	139.53

On the above table we can see the total average answered call in seconds is 198.62



The below table is constructed by using Pivot table Date & Time in the Rows section and Call_Status in the Columns Section.

After which we have calculated the individual averages in the bottom of the column and the percentage of it is also calculated.

Count of Dura	Column Labels			
Row Labels	abandon	answered	transfer	Grand Total
1-Jan	684	3883	77	4644
2-Jan	356	2935	60	3351
3-Jan	599	4079	111	4789
4-Jan	595	4404	114	5113
5-Jan	536	4140	114	4790
6-Jan	991	3875	85	4951
7-Jan	1319	3587	42	4948
8-Jan	1103	3519	50	4672
9-Jan	962	2628	62	3652
10-Jan	1212	3699	72	4983
11-Jan	856	3695	86	4637
12-Jan	1299	3297	47	4643
13-Jan	738	3326	59	4123
14-Jan	291	2832	32	3155
15-Jan	304	2730	24	3058
16-Jan	1191	3910	41	5142
17-Jan	16636	5706	5	22347
18-Jan	1738	4024	12	5774
19-Jan	974	3717	12	4703
20-Jan	833	3485	4	4322
21-Jan	566	3104	5	3675
22-Jan	239	3045	7	3291
23-Jan	381	2832	12	3225
Grand Total	34403	82452	1133	117988
	1495.782609	3584.869565	49.26086957	5129.913043
	29.16%	69.88%	0.96%	100.00%

The below table is the calculated values.

We got the time to attain the 90% calls in 254.72 hours by Average of total call duration * Total average answered call in sec * 90% converted in hours.

$$= 5129.9130 * 198.62 * 90\% * 1/3600$$

$$= 254.7$$

We got Total working persons required per day as 57 by dividing the above value with total time spent on call (4.5 from the assumption)

$$= 254.7/4.5$$

$$= 57$$

Similarly we got the Call Volume (9 am to 9 pm) is 5129.913 Average of total call duration.

$$= 5129.913$$

Additional hours required is obtained by $=(132*124*0.9)/3600$

Similarly we got additional agents. So total agents is obtained by adding both the agents 57 + 74.

Average of time taken in an answered call(call_seconds)	198.6227745	seconds
Time (hours) to attain 90% of total calls	254.7293904	Hours
Total working person required per day	57	
Call volume daily (9 AM - 9pm)	5129.913043	
If we provide support in night, (9 PM - 9 AM)	1538.973913	
Additional hours required	76.41881711	
Additional Agents	17	
Total Agents	74	

We got the below table by calculating the percentage of time with the additional agents from above.

Time Bucket	Count of Time	Required Agent
9_10	8.13%	4.6
10_11	11.28%	6.4
11_12	12.40%	7.1
12_13	10.72%	6.1
13_14	9.80%	5.6
14_15	8.95%	5.1
15_16	7.76%	4.4
16_17	7.45%	4.2
17_18	7.23%	4.1
18_19	6.13%	3.5
19_20	5.48%	3.1
20_21	4.67%	2.7
Grand Total	100.00%	57.0

- 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

We formulated the table from the above given data and according to time distribution we have obtained the agents required from the total 17 people during night calls.

Nights Call (9 pm - 9 am)	Calls Distribution	Time Distribution	Agents Required
21_22	3	10%	1.70
22_23	3	10%	1.70
23_24	2	7%	1.13
00_01	2	7%	1.13
01_02	1	3%	0.57
2_3	1	3%	0.57
3_4	1	3%	0.57
4_5	1	3%	0.57
5_6	3	10%	1.70
6_7	4	13%	2.27
7_8	4	13%	2.27
8_9	5	17%	2.83
	30	100%	17.00

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

Results:

We have learned to optimize the number of new recruits in the call center, Using Advance Excel we have obtained the results. We have also understood about the use of automated technologies in this field like Interactive Voice Response (IVR), Robotic Process Automation (RPA), Predictive Analytics, Intelligent Routing to reduce the manpower and optimize the recruits. This is one of the best implementations of the Excel in real life

Drive Link:

Excel Workbook

<https://docs.google.com/spreadsheets/d/11tsLeTpicUYafUbKKpRtmdIQ3CP0b9VS/edit?usp=sharing&ouid=106627214281497905501&rtpof=true&sd=true>

Video Link

<https://drive.google.com/file/d/1Rkl6G93Sg4yFyFTwIGzaGln7meOcsYj3/view?usp=sharing>