

ABC Call Volume Trend Analysis

Project Description

In this project we will be analysing dataset of calls made to agents by customers for a period of 23 days. As we know, inbound calls are the incoming voice calls of the existing customers or prospective customers for your business which are attended by customer care representatives. Inbound customer service is the methodology of attracting, engaging, and delighting your customers to turn them into your business' loyal advocates. By solving your customer's problems and helping them achieve success using your product or service, you can delight your customers and turn them into a growth engine for your business. We will be doing EDA to answer a few questions regarding the working and requirements of the company.

Approach

First, we cleaned the data, looked for any missing/null values and used appropriate methods to deal with them. Then, we will be doing some analyses and used tables and graphs to understand the insights achieved.

Tech-Stack Used

For this project, we used Microsoft Excel 2021 for analysis and making graphs as well.

Insights

A. Cleaning the data –

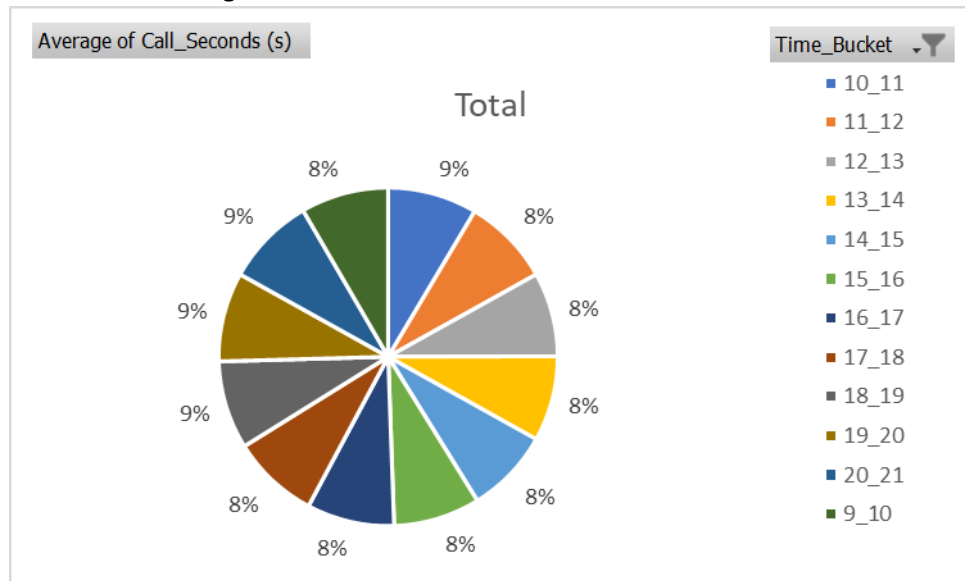
Since, all the data we used in our analysis is complete, we didn't require any modifications or cleaning of data. Only one column named 'Wrapped_by' had 40.5% missing data. But since, we didn't use it in our analysis we let the column be as it is.

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

Row Labels	Average of Call_Seconds (s)
10_11	202.5938769
11_12	198.6600372
12_13	191.1536695
13_14	193.2963998
14_15	191.9543656
15_16	195.8571429
16_17	198.2948638
17_18	197.8801445
18_19	200.1208565
19_20	202.4782232
20_21	202.5173611
9_10	198.7373282
Grand Total	196.9626009

We used pivot tables to obtain average of call_seconds and using the table formed a pie chart as shown below.

As we can see the average of all time buckets came out to be 196.962 seconds.



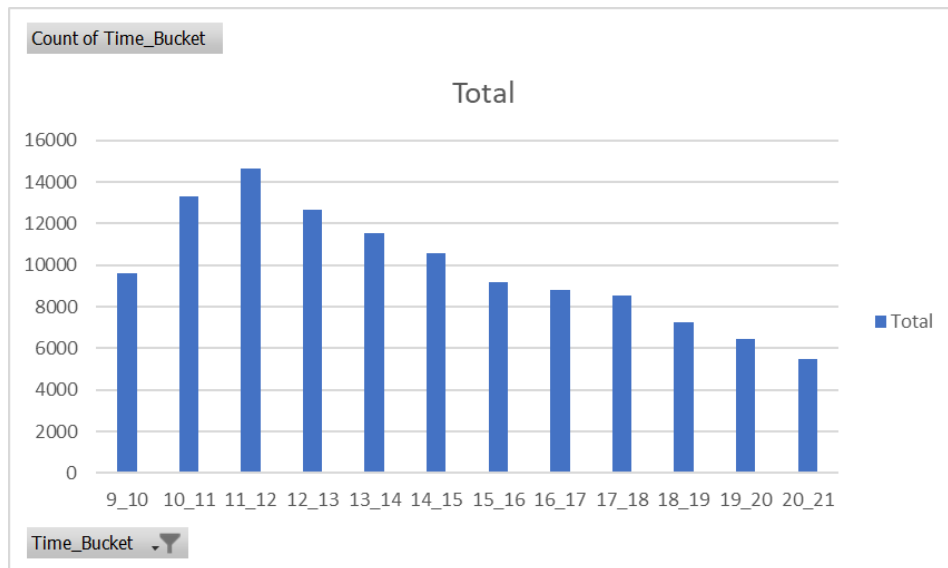
From the graph above, we can see that majority of the time buckets have 8% share only four time buckets have 9% share.

C. Show the total volume/number of calls coming in via charts/graphs.

Time_bucket	Count of Time_Bucket
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 table represents the number of calls made in each time bucket and based on this we made a bar graph as shown below.

We can see from the graph that people make more calls during 11am-12pm time bucket and it gradually came down as time moved ahead towards night.



D. Propose a manpower plan required during each time bucket to reduce abandon rate to 10%.

Here, we have to calculate minimum number of agents required in each time bucket so that at least 90 calls should be answered out of 100.

We have the following assumptions to help us with this problem.

Agent total working hours of a day = 9 Hrs

On floor working hours = 7.5 hrs

Days an agent works in a week = 6

Total time spend on a call = 4.5 hrs (60% of on floor hours)

Time_bucket	Avg_calls	Average of Call_Seconds (s)	Total_call_time(Hrs)	Num_agents_req
10_11	276.869565	203.3310302	13.77904419	3
11_12	372.173913	199.2550234	18.53938043	4
12_13	410.086957	192.8887829	19.77529348	4
13_14	383.869565	194.7401744	18.68870652	4
14_15	346.695652	193.6770755	16.78675	4
15_16	337.391304	198.8889175	16.77584783	4
16_17	341.391304	200.8681864	17.14366304	4
17_18	330.478261	200.2487831	16.54446739	4
18_19	269.565217	202.5509677	13.65017391	3
19_20	199.043478	203.4060725	10.12166304	2
20_21	124.782609	202.845993	6.327913043	1
9_10	192.521739	199.0691057	9.786410886	2
Grand Total	3584.86957	2391.770112	177.9193138	39

- Here, we calculated the Average calls by dividing the total number of calls received (that we calculated in previous question) by 23 days i.e., the total number of days of the dataset.
- Average of call_seconds is also calculated as earlier but for 'Answered' calls only.
- Total_call_time(Hrs) is the time required to answer 90% of calls which is equal to
$$= (\text{Total avg_calls} * \text{Total avg call_seconds} * 90/100) / 3600$$
 (converted seconds into hours)

- We use this formula for each time bucket and get total call_time(Hrs) as 177.919 Hrs.
- We further used the ROUND function of excel to get a rounded off figure for each time bucket in the number of agents required column.
- So, we can say that total working manpower required per day can be calculated by

$$= \text{total call_time} / \text{total time spend on calls}$$

$$= 177.919 / 4.5$$

$$= 39.537$$
- Rounding off the number we obtained, we can say that we need 40 people to attend 90% of the calls per day.

E. Propose a manpower plan required during each time bucket in a day for the calls received from 9pm to 9am in the night. (Abandon rate is same, 10%)

It is given that, suppose every 100 calls that customer made during 9 am to 9pm, customer also made 30 calls I the night between intervals.

- We know that 30 calls made by the customers during the night shift if 100 calls are made during the day. Therefore, to get total call volume during night we calculate 30% of the daytime call volume, which is = $117989 * 30 / 100$

$$= 35396.7$$
- So, we can say that for one day's manpower we will get = $35396.7 / 23$

$$= 1538.987$$

Time_bucket	Avg_calls	Average of Call_Seconds (s)	Total_call_time(Hrs)	Men_required
22_23	153.898696	203.3310302	7.823095081	2
23_24	102.59913	199.2550234	5.110848033	1
24_01	102.59913	192.8887829	4.947555348	1
01_02	51.2995652	194.7401744	2.49752157	1
02_03	51.2995652	193.6770755	2.483887441	1
03_04	51.2995652	198.8889175	2.550728749	1
04_05	51.2995652	200.8681864	2.576112658	1
05_06	153.898696	200.2487831	7.70450663	2
06_07	205.198261	202.5509677	10.39077658	2
07_08	205.198261	203.4060725	10.43464308	2
08_09	256.497826	202.845993	13.00738906	3
21_22	153.898696	199.0691057	7.659118928	2
Grand Total	1538.98696	2391.770112	77.18618316	19

- We have been provided with a table showing the distribution of the calls in each time bucket, using that table as a ratio of distribution we calculated the Avg_calls by multiplying the ratio in each time bucket.
- We already have the average of call_seconds column and we'll use it for referencing and in our formula here as well.
- Total time required to answer 90% of calls in hours is

$$= (\text{total avg_calls} * \text{avg of call_seconds(duration)} * 90/100) / 3600 \text{ (converted to hours)}$$
- We use this formula for each time bucket and get total call_time as 77.186 Hours.
- We further used the ROUND function of excel to get a rounded off figure for each time bucket in the number of agents required column.
- So, number of people required at night is

= total call time / total time spend on calls

= 77.186/4.5

= 17.152

- Rounding it off we get 17. Therefore, **we need 17 people at night shift from 9pm to 9am to receive calls.**

Result

From this project we learned a lot about the working of a customer experience inbound calling team. We gained various insights into the dataset like average call time duration, total volume of calls in each bucket and manpower required for both day and night shifts. These insights would help the company make data driven decisions that would help them solve customers' problems and help them achieve success using their product or service and turn them into a growth engine for their business.