

ABC Call Volume Trend Analysis

Project Description:

The project **ABC Call Volume Trend Analysis** is about finding the required insights for ABC Insurance Company to improve their daily functioning

A brief overview of the dataset:

- Number of observations: 1,17,989
- Number of variables: 13
- File type: CSV (Comma Separated Values)

A customer experience (CX) team consists of professionals who analyze customer feedback and data, and share insights with the rest of the organization. Typically, these teams fulfil various roles and responsibilities such as: Customer experience programs (CX programs), Digital customer experience, Design and processes, Internal communications, Voice of the customer (VoC), User experiences, Customer experience management, Journey mapping, Nurturing customer interactions, Customer success, Customer support, Handling customer data, Learning about the customer journey.

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 opportunities for Customer service representatives A.k.a. call centre agents, customer service agents. Some of the roles for them include: Email support, Inbound support, Outbound support, social media support.

Inbound customer support is defined as the call centre which is responsible for handling inbound calls of customers. 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 customers' 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.



Approach :

The main approach towards this project is to first understand the dataset provided. Then we first import the dataset provided . using various cleaning techniques we can clean the data and get rid of null values and duplicates to prepare data for analysis stage . We will use various data analysis techniques like using pivot tables, fuctions to find the insights required At the end we will display the insights extracted using various tables and charts and make it more easy to quickly understand the insights acquired

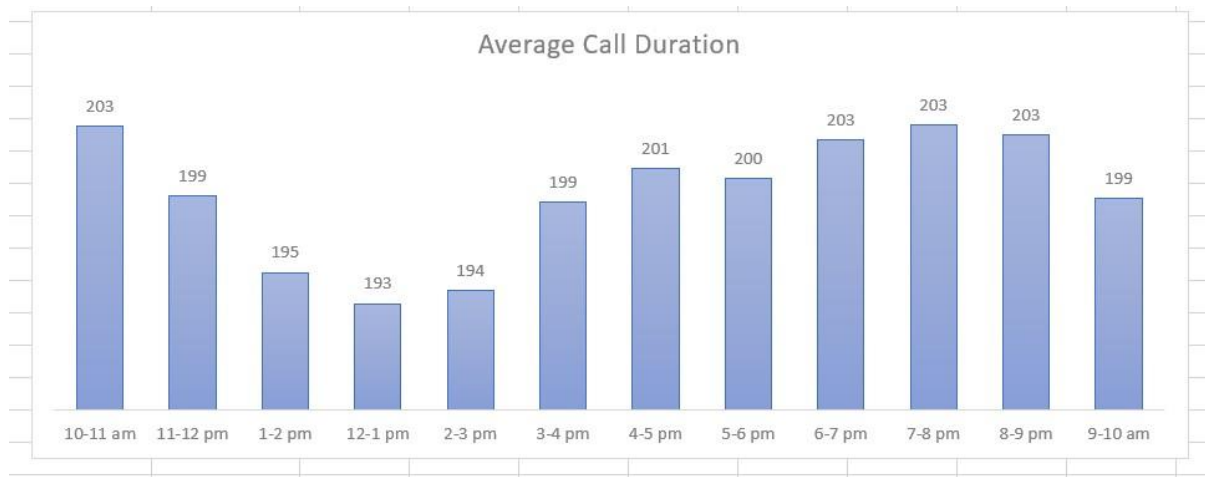
Tech used : The main software used during the project is Microsoft Excel. It helps us to clean and organize data for analysis purpose . It contains powerful tools like pivot tables , functions, power query etc to help find the insights required . And it contains charts for visualization of complex data in simple form to help us understand .

Insights :

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

Average of Duration in seconds	Call Status 	
Time Bucket 	answered	Grand Total
10-11 am	203	203
11-12 pm	199	199
1-2 pm	195	195
12-1 pm	193	193
2-3 pm	194	194
3-4 pm	199	199
4-5 pm	201	201
5-6 pm	200	200
6-7 pm	203	203
7-8 pm	203	203
8-9 pm	203	203
9-10 am	199	199
Grand Total	199	199

We create the pivot table required by putting Time_Bucket in rows and assigning Call_Status in columns and use pivot table to find average call duration. After this we get average call duration for all the call status (Abandon, Answered, Transferred) but we only require it for calls received by the agent so we filter out the call status to answered to get desired insight.



From the above graph insights we get are :

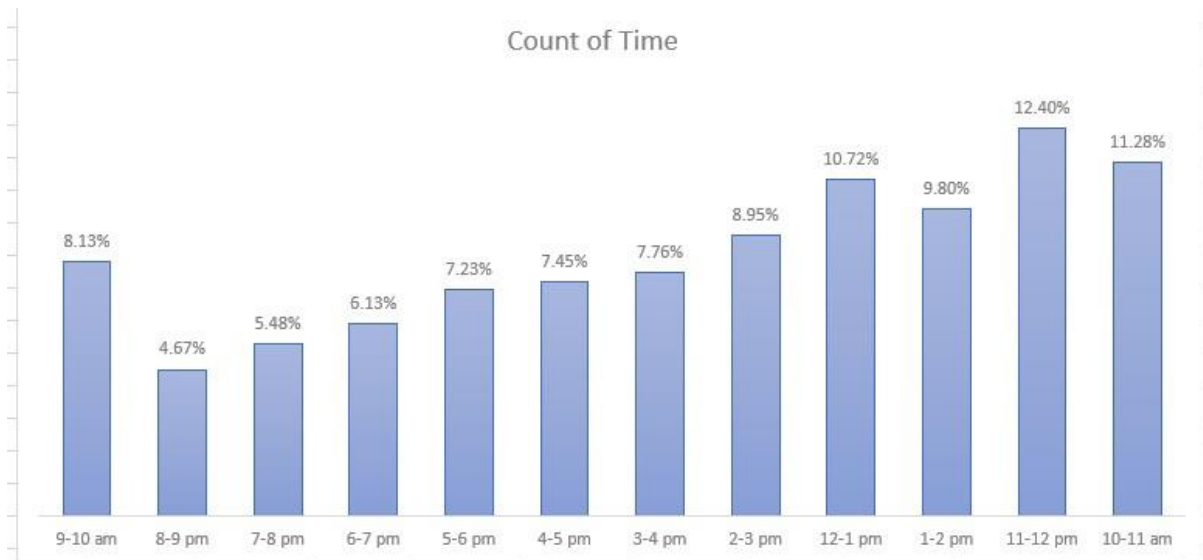
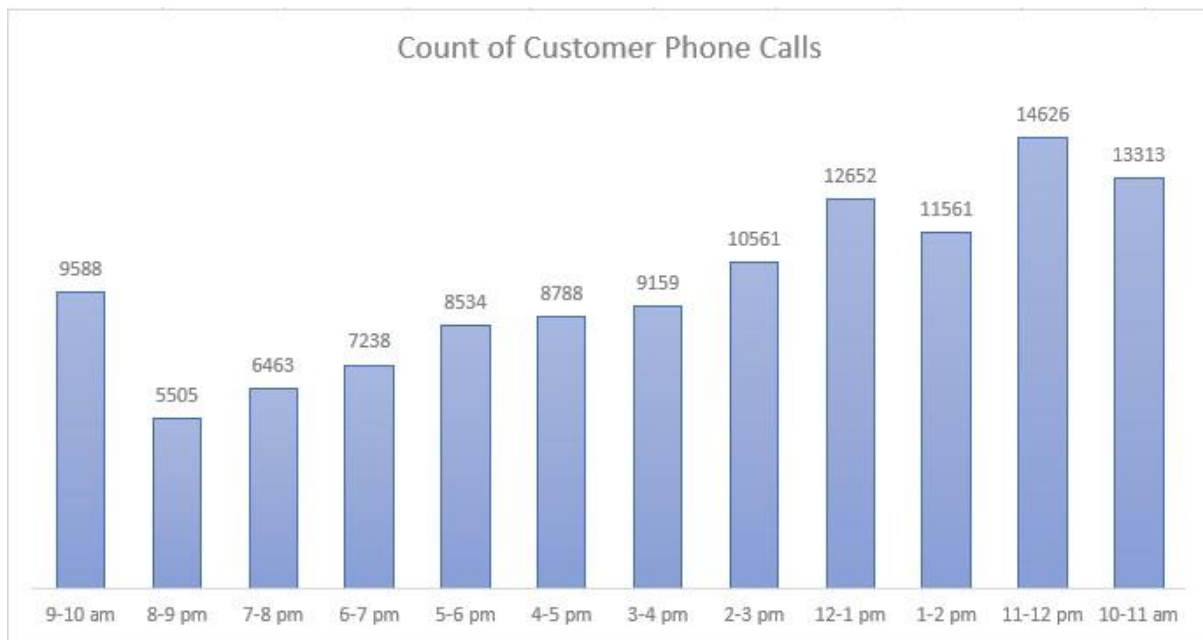
- Average of call time duration which are answered by the agents is 199 seconds
- The average call time duration for all incoming calls received by agents is the highest in between 10-11 am , 6-7pm , 7-8 pm , 8-9pm
- The average call time duration for all incoming calls received by agents is the least in between 12-1 pm.

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,)

Time Bucket ▾	Count of Customer Calls
9-10 am	9588
8-9 pm	5505
7-8 pm	6463
6-7 pm	7238
5-6 pm	8534
4-5 pm	8788
3-4 pm	9159
2-3 pm	10561
12-1 pm	12652
1-2 pm	11561
11-12 pm	14626
10-11 am	13313
Grand Total	117988

Time Bucket ▾	Count of Time
9-10 am	8.13%
8-9 pm	4.67%
7-8 pm	5.48%
6-7 pm	6.13%
5-6 pm	7.23%
4-5 pm	7.45%
3-4 pm	7.76%
2-3 pm	8.95%
12-1 pm	10.72%
1-2 pm	9.80%
11-12 pm	12.40%
10-11 am	11.28%
Grand Total	100.00%

We create these pivot table by putting Time_Bucket in rows and count of customer calls and count of time(measured as percentage of column total) in values section.



From the above graphs insights we get are :

- Customer phone calls are high between 11-12 pm
- Customer phone calls are least between 8-9pm

3) 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

Agents Working Hours in a day	9hrs
Time spent for lunch and snacks	1.5hrs
Actual workings hours of agent	7.5 hrs
In a week agent works for	6 days
Agent occupied for	60%

Count of Call_Status	Call Status			
Time Bucket	abandon	answered	transfer	Grand Total
9-10 am	5149	4428	11	9588
8-9 pm	2625	2870	10	5505
7-8 pm	1848	4578	37	6463
6-7 pm	933	6200	105	7238
5-6 pm	783	7601	150	8534
4-5 pm	747	7852	189	8788
3-4 pm	1214	7760	185	9159
2-3 pm	2475	7974	112	10561
12-1 pm	3073	9432	147	12652
1-2 pm	2617	8829	115	11561
11-12 pm	6028	8560	38	14626
10-11 am	6911	6368	34	13313
Grand Total	34403	82452	1133	117988
Percentage	29	70	1	

We calculate the percentage of call status for all time buckets and find out that abandon call percentage is 29.16% i.e around 30% as suggested in the question .

To design a manpower plan to reduce this abandon rate to 10% following steps are taken

Average time to answer a call = 198.6 seconds

To calculate this average time to answer a call we use pivot table where time bucket is assigned to rows and use call status to filter and filter it to only answered calls . Since we want average we calculate average of call seconds .

Average of Call	Column Labels	
Time Bucket	answered	Grand Total
10-11 am	203.3310302	203.3310302
11-12 pm	199.2550234	199.2550234
1-2 pm	194.7401744	194.7401744
12-1 pm	192.8887829	192.8887829
2-3 pm	193.6770755	193.6770755
3-4 pm	198.8889175	198.8889175
4-5 pm	200.8681864	200.8681864
5-6 pm	200.2487831	200.2487831
6-7 pm	202.5509677	202.5509677
7-8 pm	203.4060725	203.4060725
8-9 pm	202.845993	202.845993
9-10 am	199.0691057	199.0691057
Grand Total	198.6227745	198.6227745

Total time spent by an agent on call = $7.5 \times 60\% = 4.5\text{hrs}$

Total average calls = 5130

Count of Call_Status	Column Labels			
Days	abandon	answered	transfer	Grand Total
01-Jan	684	3883	77	4644
02-Jan	356	2935	60	3351
03-Jan	599	4079	111	4789
04-Jan	595	4404	114	5113
05-Jan	536	4140	114	4790
06-Jan	991	3875	85	4951
07-Jan	1319	3587	42	4948
08-Jan	1103	3519	50	4672
09-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
Average	1496	3585	49	5130

To calculate this average calls coming we use pivot table where we measure data and time in rows and use call status as filter again to get average calls for every call status . Since we need average of call status we measure count of call status using pivot table .

Total time required to answer 90% calls

$$= (\text{Average calls}) * (\text{Average duration of calls}) * 90\% / 3600$$

$$= (5130) * (198.6) * 90\% / 3600$$

$$= 254.7045 \text{ sec}$$

Agents required to reduce abandon rate to 10%

$$= (\text{Total time required to answer 90\% calls}) / (\text{Total time spent by an agent on call})$$

$$= (254.7) / (4.5)$$

$$= 57$$

Therefore total agents required to reduce abandon rate to 10% = 57

Manpower plan for each time bucket

Time Bucket ▼	Count of Time	Agents Req
9-10 am	8.13%	5
8-9 pm	4.67%	3
7-8 pm	5.48%	3
6-7 pm	6.13%	3
5-6 pm	7.23%	4
4-5 pm	7.45%	4
3-4 pm	7.76%	4
2-3 pm	8.95%	5
12-1 pm	10.72%	6
1-2 pm	9.80%	6
11-12 pm	12.40%	7
10-11 am	11.28%	6
Grand Total	100.00%	57

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:

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

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

Agents Working Hours in a day	9hrs
Time spent for lunch and snacks	1.5hrs
Actual workings hours of agent	7.5 hrs
In a week agent works for	6 days
Agent occupied for	60%
Total average calls	5130
Total time spent on call	4.5
Total Average Calls	5130
Total Average Calls at night	1539
Average call duration (secs)	198.6

Total time required to answer 90% calls

$$= (\text{Average calls at night}) * (\text{Average duration of calls}) * 90\% / 3600$$

$$= (1539) * (198.6) * 90\% / 3600$$

$$= 76.411$$

Agents required to reduce abandon rate to 10%

$$= (\text{Total time required to answer 90\% calls at night}) / (\text{Total time spent by an agent on call})$$

$$= (76.411) / (4.5)$$

$$= 17$$

Therefore total agents required at night to reduce abandon rate to 10% = 17

Manpower plan required at night

Night Shift	Disrtibution of 30 calls coming at night	Distribution in percentage	Agents Req
9-10 pm	3	10%	2
10-11 pm	3	10%	2
11-12 am	2	7%	1
12-1 am	2	7%	1
1-2 am	1	3%	1
2-3 am	1	3%	1
3-4 am	1	3%	1
4-5 am	1	3%	1
5-6 am	3	10%	2
6-7 am	4	13%	2
7-8 am	4	13%	2
8-9 am	5	17%	3
Total	30	100%	17

Dataset attached of data analysis :

<https://docs.google.com/spreadsheets/d/1CCwzH3R1JZsk9UsqyoT-yl8fQkuhPVp9/edit?usp=sharing&ouid=101908371018515181983&rtpof=true&sd=true>

Link for video presentation

<https://screenrec.com/share/lqu4NjGz19>

Results :

The most prominent results from the above analysis are as follows:

- Customer calls are less in the evening
- Customer calls are high from 10am to 3pm
- Company should reduce the employees during evening since calls are less and should keep more employees between 10am to 3pm since the calls are more .
- Company should hire 57 more agents during the day shift to reduce the abandon rate
- Company should hire 17 more agents during night shift to reduce the abandon rate

During this project I got experience to handle vast amounts of data and perform analysis and use various charts for visualization and derive results . I gained knowledge about behavioral analysis . I also got experience of how an analyst can help the customer call service department which will help me to become a better data analyst in future .