

ABC Call Volume Trend Analysis

Final Project-4



Introduction

In this project I have given a dataset of 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 time is converted into seconds), Call_Status (Abandon, answered, transferred).

I have to use my knowledge in statistics and apply different formulas in Excel and draw necessary conclusions about the dataset based on the following questions .

1. Calculate the average call time duration for all incoming calls received by agents.
2. Show the total volume/number of calls coming in charts and graphs.
3. Propose a manpower plan required during each time bucket [between 9am to 9pm] to reduce the abandon rate to 10 %

4. Let's say customers also call this ABC insurance company at night but don't get an 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 9 PM to 9 AM and distribution of 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%

Customer Experience (CX) team

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 fulfill 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.**

Some of the most impactful AI-empowered customer experience tools you can use today: Interactive Voice Response (IVR), Robotic Process Automation (RPA), Predictive Analytics, and Intelligent Routing

In a Customer Experience team there are huge employment opportunities 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.**

- **Email Support:** Email support is one of the communication services. Under email support, you usually need to handle the product-related challenges, queries, customer concerns, etc.
- **Inbound Support:** Inbound customer support is defined as the call center 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

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.

- **Outbound Support:** Outbound customer support makes calls on behalf of your business to your customers. It includes sales calls, customer feedback calls, subscription renewal, cross-sell, upsell, introductory calls for a new product or service launch, and letting your customers know about offers and discounts.
- **Social Media Support:** Social media support allows businesses to quickly respond to customers through private or public interactions on a variety of social media applications, including Facebook, Twitter, Instagram, LinkedIn, and other channels. This approach gives customers a convenient option to connect with support, cultivating loyalty with customers over time and building awareness through online visibility. Social media support also gives businesses the opportunity to address complaints on social media, leading to more efficient issue resolution and further defining the company's public image.

What is Advertising?

Advertising is a way of marketing your business in order to increase sales or make your audience aware of your products or services. Until a customer deals with you directly and actually buys your products or services, your advertising may help to form their first impressions of your business. Target audience for businesses could be local, regional, national or international or a mixture. So they use different ways for advertisement.

Advertising business is very competitive as a lot of players bid a lot of money in a single segment of business to target the same audience. Here comes the analytical skills of the company to target those audiences from those types of media platforms where they convert them to their customers at a low cost.

Project Approach

For this project I have given a dataset that has all the information regarding Customer Experience (CX) inbound calling and MS Excel 2007 is used to answer the questions asked. In the Call_Volume_Trend_Analysis_Project_9 dataset there are **117988** rows and **13** columns. First I checked for the missing values and found out there were **116273** present in **Agent_Name**, **Agent_ID** and **Wrapped_By** columns. Below are the details:

Columns	Total Missing Data	Missing Data Percentage
Agent_Name	34198	28.98%
Agent_ID	34198	28.98%
Customer_Phone_No	0	0.00%
Queue_Time(Secs)	0	0.00%
Date_&_Time	0	0.00%
Time	0	0.00%
Time_Bucket	0	0.00%
Duration(hh:mm:ss)	0	0.00%
Call_Seconds (s)	0	0.00%
Call_Status	0	0.00%
Wrapped_By	47877	40.58%
Ringing	0	0.00%
IVR_Duration	0	0.00%

Agent_Name and **Agent_ID** are hard to determine and also **Wrapped_By**. So I left them blank and then I performed analysis to get the insights.

THE TOOLS AND TECHNOLOGIES

The tools and technologies that I am going to use in this project would be the statistics Dataset provided by trainity and MsExcel. Excel is a spreadsheet software application used to store, organize, and analyze data. It was released in 1985 and has grown to become arguably the most important computer program in workplaces around the world. In business, any function in any industry can benefit from those with strong Excel knowledge. Excel is a powerful tool that has become entrenched in business processes worldwide—whether for analyzing stocks or issuers, budgeting, or organizing client sales lists.

Insights

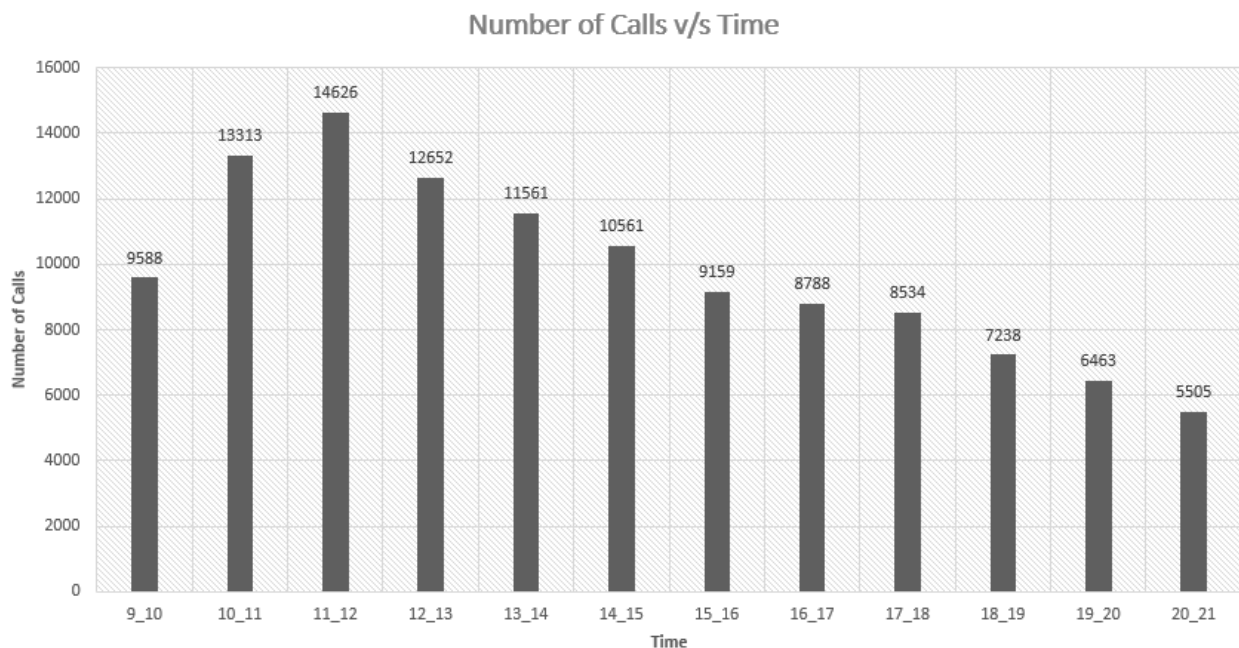
1. Calculate the average call time duration for all incoming calls received by agents (in each Time_Bucket).

Average call time duration is calculated by selecting agents where agents are not in “#N/A”.

Agent_Name (Multiple Items)	
Time_Bucket	Average Call Time Duration (s)
9_10	198.65
10_11	202.50
11_12	198.41
12_13	190.60
13_14	192.63
14_15	191.43
15_16	195.32
16_17	197.68
17_18	197.29
18_19	199.39
19_20	201.87
20_21	202.45

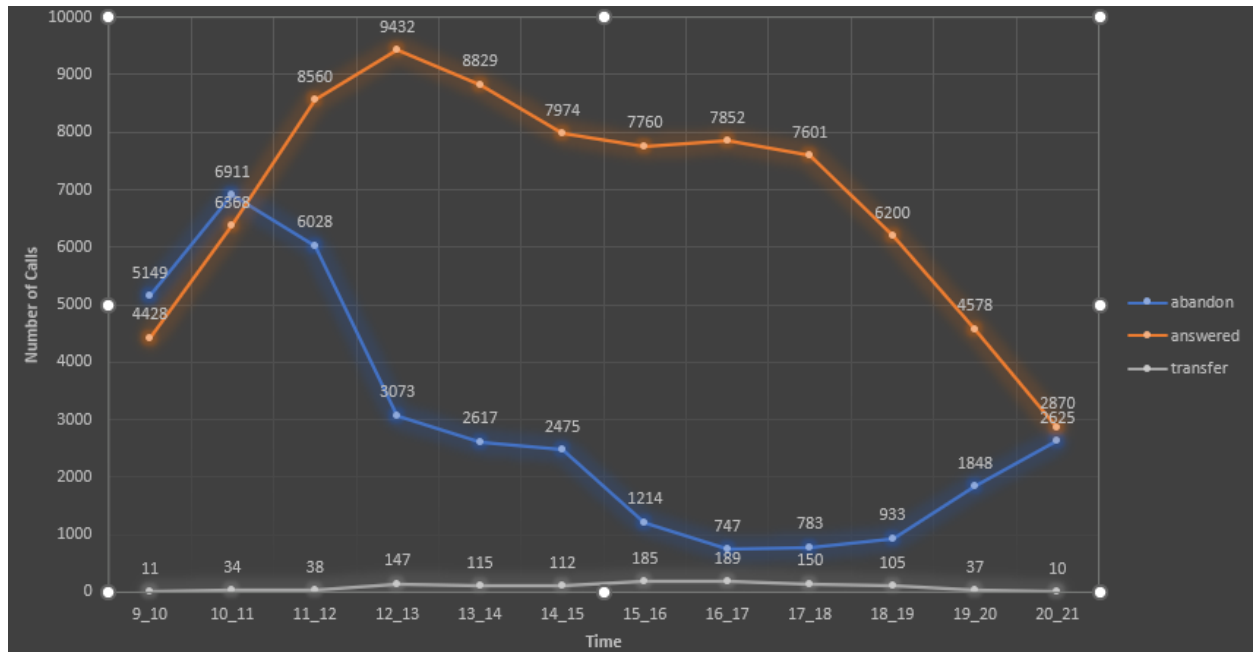
Average call time duration lies well between **190** and **202** sec.

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



Between 11 and 12 there are a maximum number of calls connected followed by 10 and 11 time brackets.

Total volume of calls coming and their statuses i.e. abandon, answer and transfer.



Mostly calls answered between 12 and 13 time bracket, but in 10 to 11 time bracket the abandon rate is highest and transfer rate starts increasing after lunch time till tea break in evening which is around 6Pm

3. As you can see, the 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 the minimum number of agents required in each time bucket so that at least 90 calls should be answered out of 100).

Call_Status	Total	(%)
Abandon	34403	29.16%
Answered	82452	69.88%
Transfer	1133	0.96%

What is an abandoned call?

The definition of an abandoned call is a call where the caller hangs up before they speak to a customer support agent.

What is the call abandonment rate?

Call abandonment rate is a **call center metric** used to measure the percentage of calls that are abandoned before they reach a customer service agent.

To calculate the abandon rate, divide the number of abandoned calls by the total number of calls, and then multiply by 100 to get the number as a percentage.

$$\text{Abandon Rate} = \frac{\text{Abandon calls}}{\text{Total calls}} * 100$$

Time_Bucket	Total Calls	Abandon		Answered		Transfer		Average of Queue_Time (Secs)
		Calls	(%)	Calls	(%)	Calls	(%)	
9_10	9588	5149	53.70%	4428	46.18%	11	0.11%	82.86
10_11	13313	6911	51.91%	6368	47.83%	34	0.26%	83.25
11_12	14626	6028	41.21%	8560	58.53%	38	0.26%	72.32
12_13	12652	3073	24.29%	9432	74.55%	147	1.16%	41.66
13_14	11561	2617	22.64%	8829	76.37%	115	0.99%	41.80
14_15	10561	2475	23.44%	7974	75.50%	112	1.06%	43.60
15_16	9159	1214	13.25%	7760	84.73%	185	2.02%	29.88
16_17	8788	747	8.50%	7852	89.35%	189	2.15%	23.54
17_18	8534	783	9.18%	7601	89.07%	150	1.76%	23.75
18_19	7238	933	12.89%	6200	85.66%	105	1.45%	34.09
19_20	6463	1848	28.59%	4578	70.83%	37	0.57%	58.69
20_21	5505	2625	47.68%	2870	52.13%	10	0.18%	75.28

From the above table we can concur, the higher queue time the greater abandon rates.

How to Reduce Abandoned Calls

Here are some ideas on how to improve call abandonment rate:

A. Adjust Schedules and Hire More Agents

- It is pertinent to hire more agents to reduce the abandonment rate
- Many abandonment rate problems (and many others) can be fixed by rescheduling the staff and equitable work distribution.

B. Create a Better Queuing Experience

- Communicating through IVR with customers while they're waiting on hold can improve call abandon rates.
- Another way to stop people from hanging up is to make the experience itself more enjoyable. Here are some ways to decrease abandoned call metrics.

i. Increase the initial ring time:

- Rather than sending callers directly, you could increase the ring time prior to patching calls into IVR. This is a pretty low-risk strategy that can buy a few extra seconds. Over thousands of calls, this could save a few hours.

ii. Keep customers informed:

- If hold-times are an issue, consider preparing customers by placing a message in the IVR informing callers of the estimated wait time.
- If you can't estimate a wait time, tell customers what number they are in the queue, so at least they perceive some progress.

iii. Change queue message frequency:

- Another consideration should be how frequently you are playing recorded messages in your IVR, as this may irritate callers unnecessarily.

C. Reduce average handle time

Lowering the amount of time agents spend on each call will help serve more customers overall. If agents are adept at anticipating customer needs and efficient in solving their issues, they can handle **higher call volumes** more easily.

To reduce abandonment rate the obvious move is to hire more agents so that the wait is lower. Below table represents the minimum number of agents required in each time bucket so that at least 90 calls should be answered out of 100.

The manpower is calculated using the following formula:

$$\frac{M_1 * D_1 * H_1 * E_1}{W_1} = \frac{M_2 * D_2 * H_2 * E_2}{W_2}$$

where,

M_1 & M_2 = Manpower

D_1 & D_2 = Number of Days

H_1 & H_2 = Number of Hours

E_1 & E_2 = Efficiency

W_1 & W_2 = Work Done

Steps to calculate minimum number of agents required

- i. Finding the Total Agents in each time bracket using the Pivot table.
- ii. Reserved the Abandon rate at 10% and calculated the remaining 90% of Total Calls for that time bucket.
- iii. Subtracting Answered Calls from 90% of Total Calls to get the Remaining Calls (which is remaining work to be done).
- iv. Then find the number of Additional Manpower Required using the below formula:

$$\text{Additional Manpower Required} = \frac{\text{Total Agents} * \text{Remaining Calls}}{\text{Answered Calls}}$$

- v. In the final step add Total Agents and Additional Manpower Required columns to get Minimum Number of Agents Required.

Time_Bucket	Total Agents	90% of Total Calls	Answered Calls	Remaining Calls	Additional Manpower Required	Minimum Number of Agents Required
9_10	41	8629	4428	4201	39	80
10_11	50	11982	6368	5614	44	94
11_12	58	13163	8560	4603	31	89
12_13	59	11387	9432	1955	12	71
13_14	57	10405	8829	1576	10	67
14_15	59	9505	7974	1531	11	70
15_16	57	8243	7760	483	4	61
16_17	57	7909	7852	57	0	57
17_18	57	7681	7601	80	1	58
18_19	58	6514	6200	314	3	61
19_20	51	5817	4578	1239	14	65
20_21	26	4955	2870	2085	19	45

4. Let's say customers also call this ABC insurance company at night but don't get an 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)											
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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 the same 10%.

Total calls made during day are 100% then 30% of day calls are calculated below:

Calls	100%	30%
	117988	35396

Steps to calculate minimum number of agents required

i. Calculate the Total Calls by applying following formula:

$$\text{Total Calls} = \frac{30\% \text{ of Day Calls} * \text{Frequency of Calls}}{\text{Total Frequency}}$$

ii. Reserved the Abandon rate at 10% and calculated the remaining 90% of Total Calls for that time bucket.

iii. Number of Days is calculated by assuming that the first day of the month starts between Monday and Saturday then there are three Sundays till 23rd day.

$$\begin{aligned} \text{Number of Days} &= 23 - 3 (\text{Sunday}) \\ &= 20 \text{ Days} \end{aligned}$$

iv. Total Actual Working Hrs is calculated by multiplying Total Working Hrs with Efficiency.

v. Then Minimum Number of Agents Required is calculated using the below formula:

$$\text{WORK} = M * D * H$$

then,

$$M = \text{work} / D * H$$

Where,

M = Manpower

D = Number of Days

H = Number of Hours

Minimum Number of Agents Required = 90%of total calls/Number of days *Total actual working hours

Time_Bucket	Distribution of Calls	Total Calls	90% of Total Calls	Number of Days	Total Working Hrs	Efficiency in (%)	Total Actual Working Hrs	Minimum Number of Agents Required
9_10	3	3540	3186	20	7.5	60.00%	4.5	35
10_11	3	3540	3186	20	7.5	60.00%	4.5	35
11_12	2	2360	2124	20	7.5	60.00%	4.5	24
12_1	2	2360	2124	20	7.5	60.00%	4.5	24
1_2	1	1180	1062	20	7.5	60.00%	4.5	12
2_3	1	1180	1062	20	7.5	60.00%	4.5	12
3_4	1	1180	1062	20	7.5	60.00%	4.5	12
4_5	1	1180	1062	20	7.5	60.00%	4.5	12
5_6	3	3540	3186	20	7.5	60.00%	4.5	35
6_7	4	4719	4247	20	7.5	60.00%	4.5	47
7_8	4	4719	4247	20	7.5	60.00%	4.5	47
8_9	5	5899	5309	20	7.5	60.00%	4.5	59

Result

How this project helped me: This project helps me to understand the importance of data analysis. Through this project I am able to understand Call Volume Trend Analysis and how the companies use this data as a secret weapon. With an informed and proactive approach, they can leverage insights to make data-backed decisions that optimize their strategy and boost ROI.

Challenges that I faced in this project: Personally I feel that it was easy to solve the questions but finding the manpower is a challenge.

Conclusion: Living in a world where there are sophisticated platforms to make everyday work simpler and MS Excel is the perfect example of this, knowing how to interpret in real time can help us to find out what performs best. Whenever utilized correctly data analytics achieved a significant positive effect on our general public.