ABC Call Volume Trend Analysis

Introduction

A Customer Experience (CX) team plays a crucial role in a company. They analyze customer feedback and data, derive insights from it, and share these insights with the rest of the organization. This team is responsible for a wide range of tasks, including managing customer experience programs, handling internal communications, mapping customer journeys, and managing customer data, among others.

In the current era, several AI-powered tools are being used to enhance customer experience. These include Interactive Voice Response (IVR), Robotic Process Automation (RPA), Predictive Analytics, and Intelligent Routing.

One of the key roles in a CX team is that of the customer service representative, also known as a call centre agent. These agents handle various types of support, including email, inbound, outbound, and social media support.

Inbound customer support, which is the focus of this project, involves handling incoming calls from existing or prospective customers. The goal is to attract, engage, and delight customers, turning them into loyal advocates for the business.

Project Description

A dataset has been given to us, which consists of information about inbound calls received by a company called ABC, operating in the insurance sector. Sometimes, customers' calls are abandoned due to the unavailability of call centre agents, leading to a poor customer experience.

In this project, to improve customer engagement and enhance their overall experience, we will be using our analytical skills to understand the trends in the call volume of the CX team and derive valuable insights from it. We will also address the following questions:

- **Average Call Duration**: Determine the average duration of all incoming calls received by agents.
- **Call Volume Analysis**: Visualize the total number of calls received.
- **Manpower Planning (Day Shift)**: Propose a plan for manpower allocation during each time bucket (from 9 am to 9 pm) to reduce the abandon rate from the existing 30% to 10%.
- **Manpower Planning (Night Shift)**: Assuming that for every 100 calls that customers make between 9 am and 9 pm, they also make 30 calls at night between 9 pm and 9 am. Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

Approach

The reference notes provided in the project was very helpful in understanding the concept of Customer Experience Analytics and in planning the step-by-step approach to perform our tasks.

Firstly, after downloading the dataset, when I started the cleaning process, I noticed that columns "Queue_Time(Secs)", "Wrapped _By" and "Ringing" were not relevant to our analysis. So, these columns were deleted. The entire data was then converted into a table.

Then I created pivot tables and visualization charts to analyze the data and gain insights from them in order to address the questions raised by the company.

I used Microsoft Excel for Microsoft 365 to perform the entire analysis on the dataset because it helps users to format, arrange, and perform calculations on data within a spreadsheet, presenting the information in a user-friendly, easy-to-navigate manner. Furthermore, it efficiently transforms large datasets into informative graphics and charts for better understanding and visualization.

Link to the Excel file : ABC Call Volume Trend Analysis

Assumptions

We were given the assumption that an agent works for 6 days a week. On average, each agent takes 4 unplanned leaves per month. An agent's total working hours are 9 hours, out of which 1.5 hours are spent on lunch and snacks in the office. On average, an agent spends 60% of their total actual working hours (i.e., 60% of 7.5 hours) on calls with customers/users. This data was depicted in the form of a table for better understanding.

Assumptions	
Work days of an agent	6
Unplanned leaves (days) of an agent per month	4
Total Working Hours	9
Break Time	1.5
Actual working hours	7.5
On Call Time by an Agent (60% of 7.5hrs)	4.5
Other Office work	3

1. Average Call Duration

Determine the average duration of all incoming calls received by agents..

Pivot Table was generated to get the average call duration of all calls received by the agents.

The "Time_Bucket" column was taken as rows and the average of "Call_Seconds" columns was taken as values.

We also used a filter on the column "Call_Status" to check only the details for the answered and transferred calls, , ignoring the abandoned ones.

Call_Status	(Multiple Items)
Time Bucket	**Average Call Duration (in secs)**
09_10	198.7
10_11	202.6
11_12	198.7
12_13	191.2
13_14	193.3
14_15	192.0
15_16	195.9
16_17	198.3
17_18	197.9
18_19	200.1
19_20	202.5
20_21	202.5
Grand Total	**197.0**

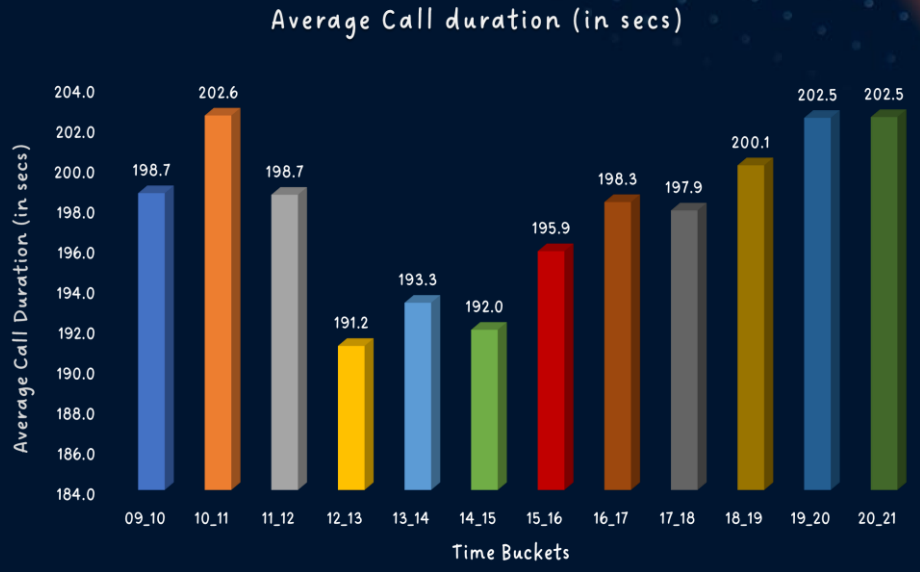
The average duration of all received calls between 9am and 9pm is 197 seconds.

1. Average Call Duration

Determine the average duration of all incoming calls received by agents.

Based on the Pivot Table, a bar graph was generated.

As per the bar graph, it is evident that most of the agents were occupied with lengthier call durations during two main time periods: the morning between 10 am and 11 am, and the evening between 7 pm and 9 pm. The time frame from 12 pm to 3 pm experienced significantly shorter call durations.



2. Call Volume Analysis

Visualize the total number of calls received in each time bucket

Pivot Table was generated to visualize the total number of calls received by the agents in each time bucket.

The "Time_Bucket" column was taken as rows and the count of "Customer_Phone_No" columns was taken as values.

We also used the column "Customer_Phone_No" as percentage of column total to check the percentage of calls in each time bucket in the 12-hour window.

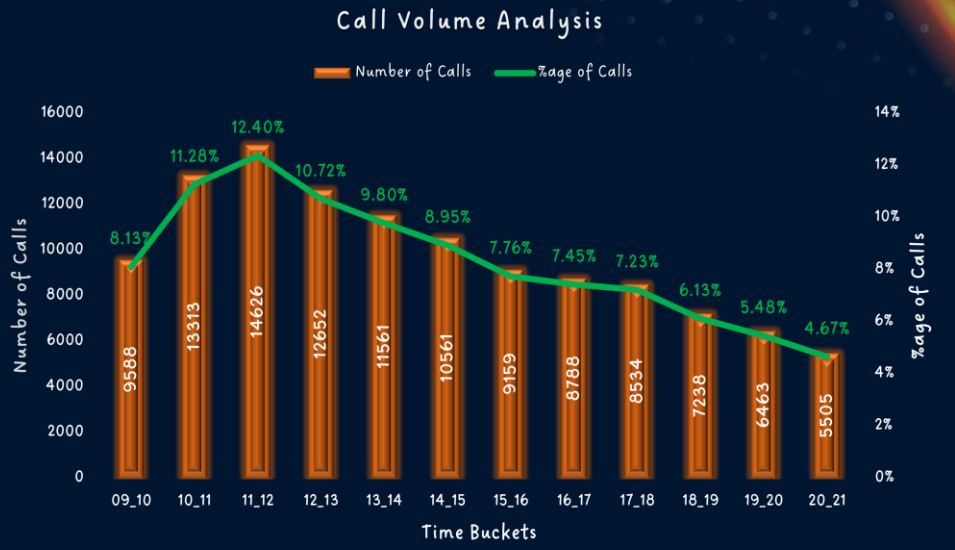
Time Bucket	Number of Calls	%age of Calls
09_10	9588	8.13%
10_11	13313	11.28%
11_12	14626	12.40%
12_13	12652	10.72%
13_14	11561	9.80%
14_15	10561	8.95%
15_16	9159	7.76%
16_17	8788	7.45%
17_18	8534	7.23%
18_19	7238	6.13%
19_20	6463	5.48%
20_21	5505	4.67%
Grand Total	**117988**	**100.00%**

2. Call Volume Analysis

Visualize the total number of calls received in each time bucket

Based on the Pivot Table, a bar graph was generated.

As per the bar graph, it is evident that the number of calls received follows a general decreasing trend as the day progresses. The call volume tend to increase in the morning hours from 9 am to 12 pm with highest calls between 11am and 12 pm with 14626 calls, and it gradually decreases until it reaches the lowest point in the evening between 8pm and 9pm with 5505 calls.



3. Manpower Planning (Day Shift)

Propose a manpower plan during each time bucket (from 9 am to 9 pm) to reduce the abandon rate from the existing 29.16% (close to 30%) to 10%.

Pivot Table was generated to get the average call duration of only the calls answered by the agents.

The "Time_Bucket" column was taken as rows and the average of "Call_Seconds" columns was taken as values and used a filter on the column "Call_Status" to check only the details for the answered calls, , ignoring the abandoned ones and the transferred ones.

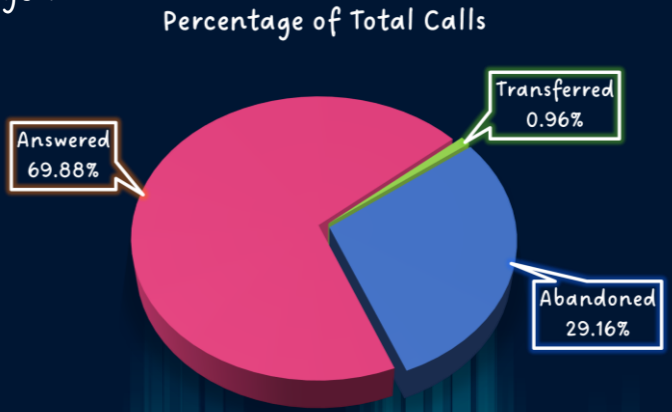
The average duration of all received calls between 9am and 9pm is 198.6 seconds.

Call_Status	answered
Row Labels	**Avg Call Duration (in secs)**
09_10	199.1
10_11	203.3
11_12	199.3
12_13	192.9
13_14	194.7
14_15	193.7
15_16	198.9
16_17	200.9
17_18	200.2
18_19	202.6
19_20	203.4
20_21	202.8
Grand Total	**198.6**

3. Manpower Planning (Day Shift)

A Pivot Table was created to examine the daily count of calls classified as abandoned, answered, and transferred from a dataset spanning 23 days. The "Date_&_Time" column was used for rows, the "Call_Status" column for columns, and the count of the "Duration" column for values.

Using the generated table, we computed the average number of abandoned, answered, and transferred calls per day. Subsequently, a pie chart was generated to visually represent these averages.



Count of Duration(hh:mm:ss)	Column Labels			
Dates	Abandoned	Answered	Transferred	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

	Abandoned	Answered	Transferred	Total
Average Calls/Day	1496	3585	49	5130
Percentage of Total Calls	29.16	69.88	0.96	

3. Manpower Planning (Day Shift)

Based on the provided assumption, we calculated that agents spend 4.5 hours attending calls during their 9-hour shift. Additionally, we found that the call centre receives an average of 5130 calls per day.

To calculate the total time needed to answer 90% of calls, we used the formula: (5130 x 198.6 x 0.9) / 3600, which resulted in 254.70 hours.

Next, to determine the number of agents required to answer 90% of the calls, we used the formula: 254.7 / 4.5 = 56.6, rounding it off to 57. Therefore, we need 57 agents during the Day Shift to achieve our target of 90% answered calls or 10% abandoned calls.

Time taken on an average to answer a call (secs)	198.6
Time requirement to answer 90% of the calls (hrs)	254.70
Total working person required per day	57

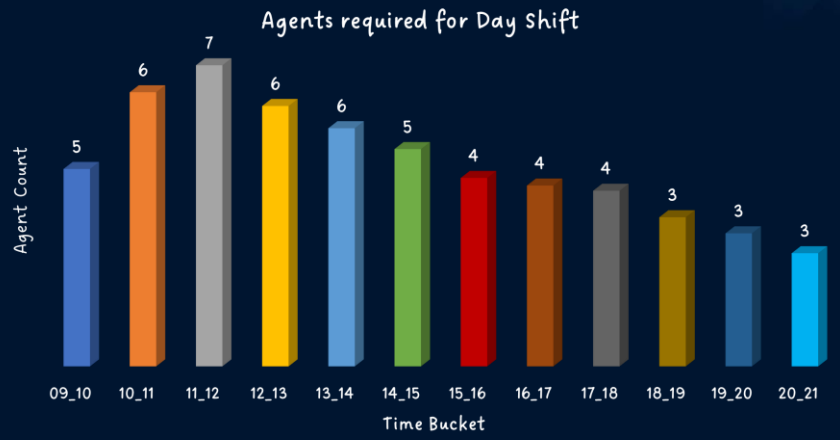
3. Manpower Planning (Day Shift)

Since we already computed the total number of calls per time bucket for 23 days, we then calculated the same for 1 day using the formula: (total calls for 23 days) / 23.

Furthermore, we calculated the time required to answer 90% of the calls for each time bucket using the formula: (total calls per day) x (198.6/3600) x 0.9.

Finally, we determined the required count of agents per time bucket using the formula: (time required to answer 90% of the calls for each time bucket) / (Actual On-Call Time of an Agent). The resulting values were in decimal, but we rounded them off to whole numbers.

Row Labels	Abandoned	Answered	Transferred	Grand Total	Calls/Day	Time required to answer 90% of the calls (hrs)	Agents required
09_10	5149	4428	11	9588	417	20.70	5
10_11	6911	6368	34	13313	579	28.75	6
11_12	6028	8560	38	14626	636	31.58	7
12_13	3073	9432	147	12652	550	27.31	6
13_14	2617	8829	115	11561	503	24.97	6
14_15	2475	7974	112	10561	459	22.79	5
15_16	1214	7760	185	9159	398	19.76	4
16_17	747	7852	189	8788	382	18.97	4
17_18	783	7601	150	8534	371	18.42	4
18_19	933	6200	105	7238	315	15.64	3
19_20	1848	4578	37	6463	281	13.95	3
20_21	2625	2870	10	5505	239	11.87	3
Grand Total	34403	82452	1133	117988	5130	254.70	57



4. Manpower Planning (Night Shift)

Assuming that for every 100 calls that customers make between 9 am and 9 pm, they also make 30 calls at night between 9 pm and 9 am, we were given the distribution of these 30 calls 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

Propose a manpower plan during each time bucket (from 9 pm to 9 am) to maintain the abandon rate of 10%.

Based on the previous pivot table, we have determined that the Total Average calls per day shift were 5130. Consequently, the night shift receives 30% of this number, which amounts to 1539 calls (5130 x 30% = 1539).

Out of the 1539 calls received during the night shift, it is essential to maintain an abandon rate of 10%, meaning 90% of the calls, which is equivalent to 1385 calls, need to be answered.

To calculate the total time required to answer these 1385 calls, we used the formula: 1385 x 198.6 / 3600, resulting in 76.41 hours.

4. Manpower Planning (Night Shift)

To determine the number of agents needed to answer 90% of the calls, we used the formula: 76.41 / 4.5 = 16.98, rounded off to 17 agents.

Therefore, to achieve the target of having 90% of the calls answered or only 10% abandoned, 17 agents are required during the Night Shift.

Now, considering the given information of 30 calls during the night shift, we can calculate the total number of calls for each time bucket in the night shift using the formula: (call distribution of each time bucket of 30 calls) x 1539 / 30.

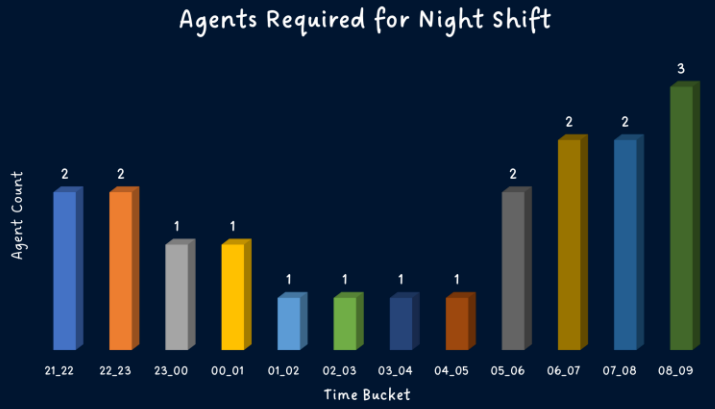
Next, we determined the time required to answer 90% of the total number of calls for each time bucket using the formula: (total number of calls for each time bucket) x (198.6/3600) * 0.9.

Finally, the Required count of agents per time bucket was calculated using the formula: (time required to answer 90% of the calls for each time bucket) / (Actual On-Call Time of an Agent).

4. Manpower Planning (Night Shift)

Average Calls/Day	5130
30% of Avg Calls/Day in Night shift	1539
Abandon Rate of 10% in Night Shift	154
Answered Rate of 90% in Night Shift	1385
Average time per call (in secs)	198.6
Total Time to Answer 90% Calls	76.41
Total Agents Required	17

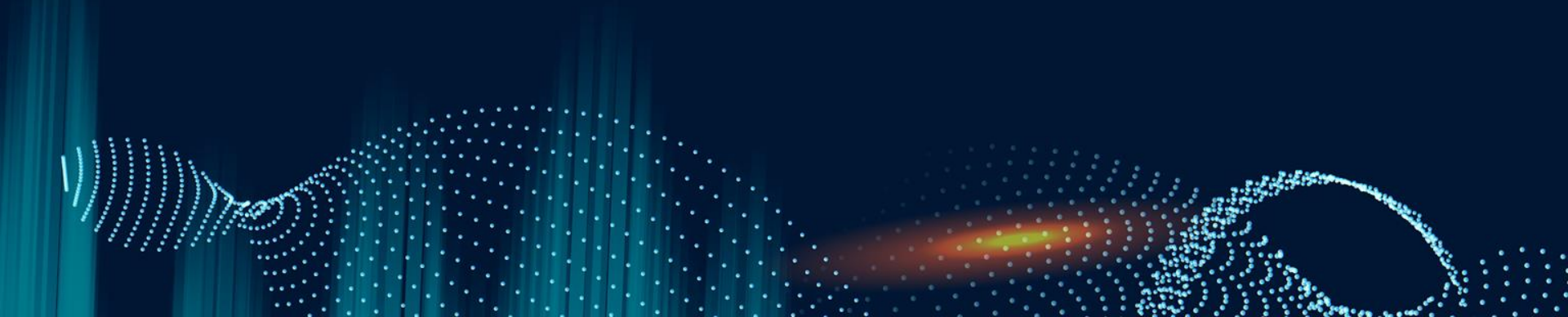
Night Shift	Call Distribution	Calls/Night	Time required to answer 90% of the calls (hrs)	Agents Required
21_22	3	154	7.65	2
22_23	3	154	7.65	2
23_00	2	103	5.11	1
00_01	2	103	5.11	1
01_02	1	51	2.53	1
02_03	1	51	2.53	1
03_04	1	51	2.53	1
04_05	1	51	2.53	1
05_06	3	154	7.65	2
06_07	4	205	10.18	2
07_08	4	205	10.18	2
08_09	5	257	12.76	3
Grand Total	30	1539	76.41	17

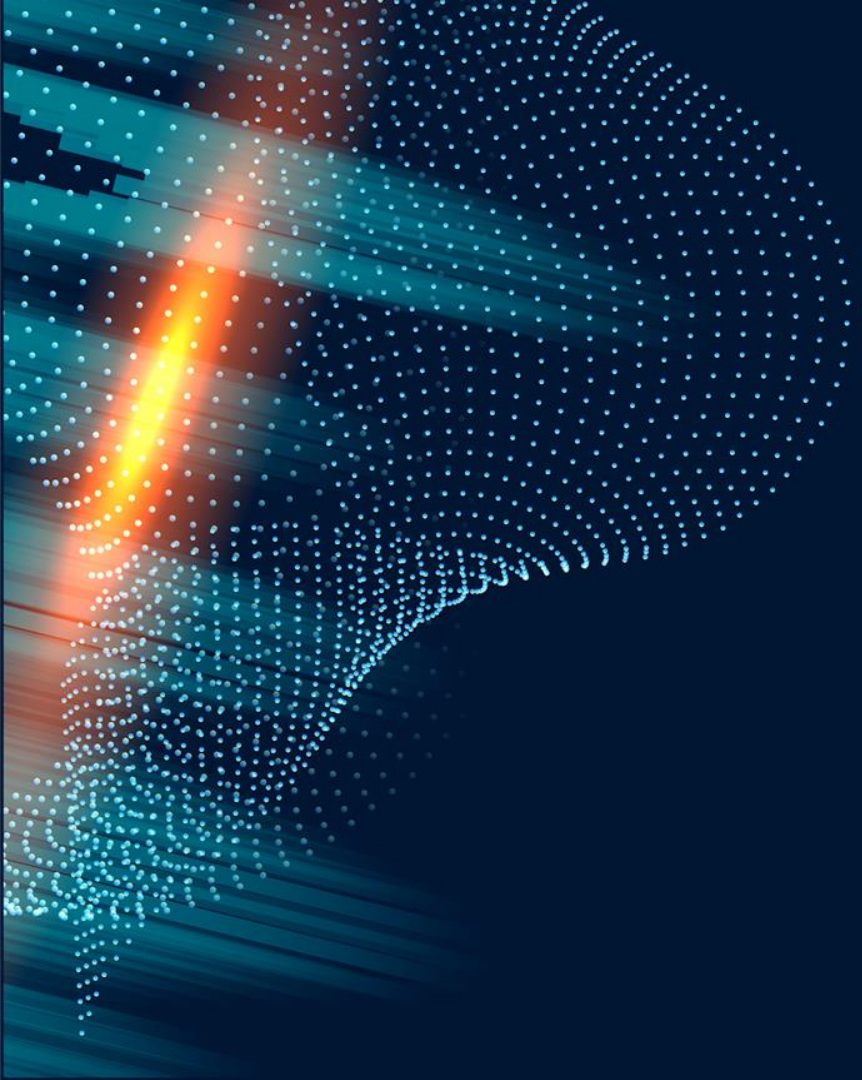


So, in total, we need 57 + 17 = 74 agents in a day to answer calls to keep the abandoned rate to 10%.

Conclusion

This project provided valuable insights into the call centre's performance, including average call durations and call volume patterns. Furthermore, by formulating comprehensive manpower planning strategies, we aimed to improve the customer experience by ensuring a lower abandon rate and addressing customer calls throughout the day, including the night shift. These proposed plans take into account various assumptions related to agent availability and working hours. Implementing these recommendations will contribute to a more efficient and effective customer support system, ultimately enhancing customer satisfaction and loyalty for ABC Insurance Company.





THANK YOU!