ABC Call Volume Trend Analysis

Description:

In this project, you'll be diving into the world of Customer Experience (CX) analytics, specifically focusing on the inbound calling team of a company. You'll be provided with a dataset that spans 23 days and includes various details such as the agent's name and ID, the queue time (how long a customer had to wait before connecting with an agent), the time of the call, the duration of the call, and the call status (whether it was abandoned, answered, or transferred).

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 center 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.

Business Understanding:

Advertising is a crucial aspect of any business. It helps increase sales and makes the audience aware of the company's products or services. The first impressions of a business are often formed through its advertising efforts.

The target audience for businesses can be local, regional, national, or international. Various types of advertising are used to reach these audiences, including online directories, trade and technical press, radio, cinema, outdoor advertising, and national papers, magazines, and TV.

The advertising business is highly competitive, with many players bidding large amounts of money to target the same audience segment. This is where the company's analytical skills come into play. The goal is to identify those media platforms that can convert audiences into customers at a low cost.

Data Analytics Tasks:

You have been provided with a dataset that contains information about the inbound calls received by a company named ABC, which operates in the insurance sector. Your task is to use this data to answer the following questions:

1. **Average Call Duration:** Determine the average duration of all incoming calls received by agents. This should be calculated for each time bucket.

Your Task: What is the average duration of calls for each time bucket?

2. **Call Volume Analysis:** Visualize the total number of calls received. This should be represented as a graph or chart showing the number of calls against time. Time should be represented in buckets (e.g., 1-2, 2-3, etc.).

Your Task: Can you create a chart or graph that shows the number of calls received in each time bucket?

3. **Manpower Planning:** The current rate of abandoned calls is approximately 30%. Propose a plan for manpower allocation during each time bucket (from 9 am to 9 pm) to reduce the abandon rate to 10%. In other words, you need to calculate the minimum number of agents required in each time bucket to ensure that at least 90 out of 100 calls are answered.

Your Task: What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%?

4. **Night Shift Manpower Planning:** Customers also call ABC Insurance Company at night but don't get an answer

because there are no agents available. This creates a poor customer experience. Assume 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. The distribution of these 30 calls is as follows:

Your Task: Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

Assumptions: 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. The total number of days in a month is 30.

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

Project Description :

In the ABC Call Volume Trend Analysis project, the aim is to optimize the operations of a company's Customer Experience (CX) team by analyzing inbound call data over 23 days. The focus is on reducing the call abandon rate from 30% to 10%, enhancing night shift support, and providing insights into customer call patterns. The project will explore trends in call durations, visualize call volumes, and develop manpower strategies to improve customer satisfaction and streamline CX team efficiency. The ultimate goal is to ensure better resource allocation and continuous support for customers.

Approach :

The approach begins with calculating the average call duration for each time bucket to identify patterns in customer interactions. Next, call volumes will be visualized to highlight peak times and trends. Manpower planning will follow, with the aim of optimizing resource allocation to reduce the call abandon rate. A specific plan for night shift staffing will also be developed to ensure continuous customer support. Statistical tools and visualizations will be employed to extract meaningful insights and drive improvements in CX operations.

Tech-Stack Used :

The tech stack used for the ABC Call Volume Trend Analysis project includes Microsoft Excel for comprehensive data analysis, such as calculating average call durations and developing manpower plans. Pivot Tables within Excel are leveraged to efficiently summarize and analyze call data, providing insights into trends and resource needs. Excel's data visualization tools help in creating charts and graphs to represent call volumes and trends. This stack supports effective analysis and presentation of findings to enhance the CX team's efficiency.

Data Cleaning Process :

- **Total Columns : 13**
- **Total Rows : 117988**
- **Duplicate Rows : 0**
- **Wrapped_By Column :** 44387 null values

The data cleaning process began by confirming that there were no duplicate rows in the dataset. Next, null values were identified across all columns, with 44,387 null values found in the "wrapped by" column. To address this, the formula **`=IF(AND(ISNA(A7), ISNA(B7)), "Abandoned Call", K2)`** was used to label rows with missing agent name and ID (both as #N/A) as "Abandoned Call." For the remaining null values in the column, the mode (which was "Agent") was applied to fill in the gaps. After these steps, the data was thoroughly cleaned and ready for analysis.

Insights :

The analysis provides key insights into call duration trends, identifying peak periods and staffing needs to improve efficiency. It highlights necessary adjustments in manpower to reduce call abandonment rates and ensures continuous support during night shifts. These findings are crucial for optimizing the CX team's performance and enhancing customer satisfaction.

Assumptions:

The analysis is based on several key assumptions: each agent works six days a week and takes an average of four unplanned leaves per month. Agents are available for 9 hours per day, with 1.5 hours allocated for breaks, resulting in 7.5 effective working hours. It is assumed that agents spend 60% of these hours on calls. Additionally, the total number of days considered in the

month is 30. These assumptions help in accurately calculating manpower requirements and planning for optimal call handling**.**

TASK 1 :

Average Call Duration : Determine the average duration of all incoming calls received by agents. This should be calculated for each time bucket.

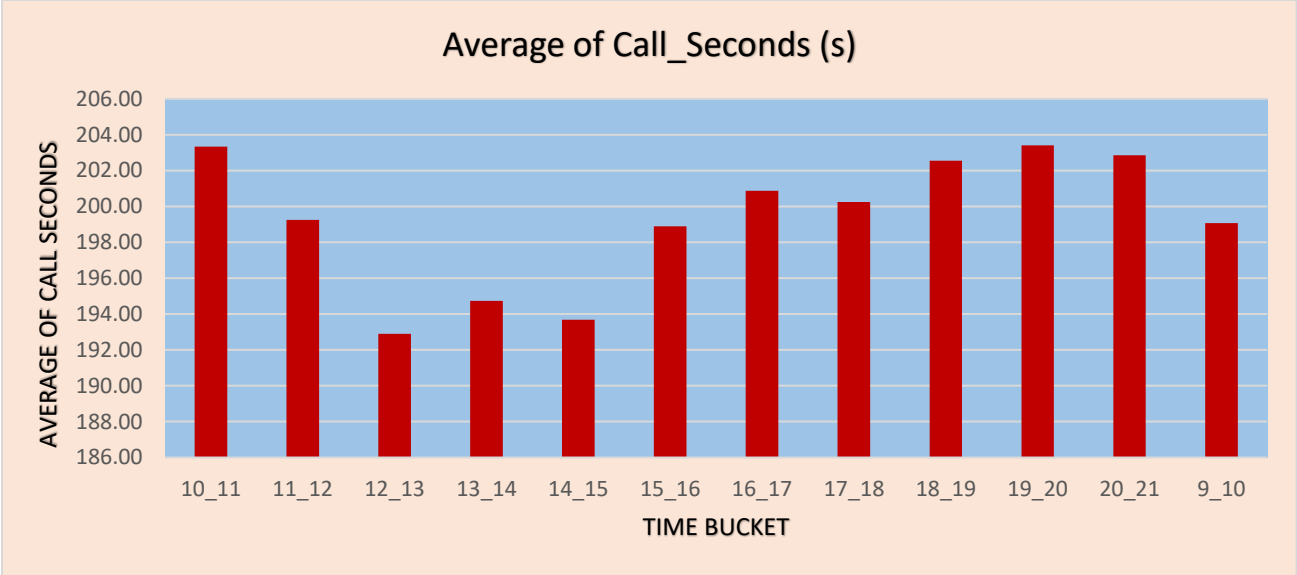
Your Task: What is the average duration of calls for each time bucket?

Ans :

- The task involves calculating the average duration of incoming calls for each time bucket throughout the day. This will help identify trends in call length during different periods, aiding in better resource planning.

- To determine the average call duration for each time bucket, I created a Pivot Table with time buckets in the rows and used the call status as a filter to focus on answered calls. I then placed the call duration (in seconds) in the value row to calculate the average call duration specifically for answered calls. After calculating the average call duration for each time bucket using a Pivot Table, I created a bar chart to visually represent the average call duration across different time periods. This helps in easily identifying trends and patterns in call length throughout the day.

Time Bucket	Average of Call_Seconds (s)
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
9_10	199.07
Grand Total	**199**



The purpose of calculating the average call duration for each time bucket is to understand how long agents spend on calls during different periods of the day. This analysis helps identify peak times when calls tend to be longer or shorter, which is essential for optimizing staffing, improving efficiency, and ensuring that agents are adequately available to handle incoming calls during high-demand periods.

TASK 2 :

Call Volume Analysis: Visualize the total number of calls received. This should be represented as a graph or chart showing the number of calls against time. Time should be represented in buckets (e.g., 1-2, 2-3, etc.).

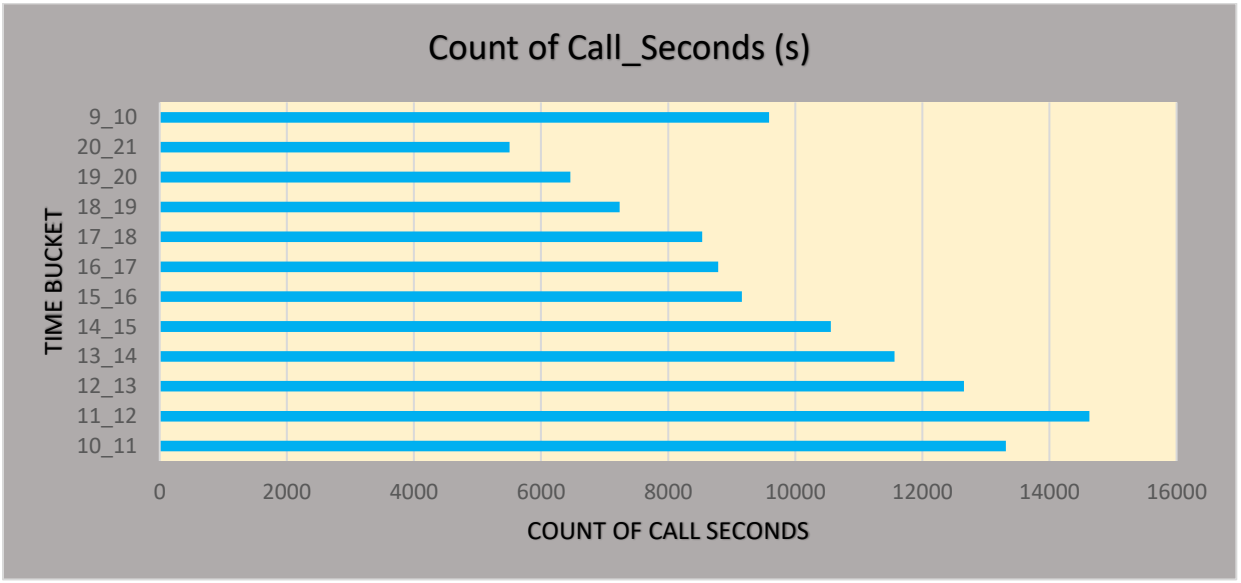
Your Task: Can you create a chart or graph that shows the number of calls received in each time bucket?

Ans :

- The task is to create a chart or graph that visualizes the total number of calls received in each time bucket. This helps in identifying peak call periods and understanding overall call volume trends.

- To visualize the total number of calls received, I first created a Pivot Table with time buckets in rows and placed call seconds in the value row to count the total number of calls for each time bucket. I then used these values to create a bar chart, which illustrates the number of calls received across different time periods.

Time Bucket	Count of Call_Seconds (s)
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
9_10	9588



The purpose of this task is to visualize the total number of calls received in each time bucket to understand call volume patterns throughout the day. By identifying peak and off-peak periods, this analysis aids in optimizing staffing levels and improving

resource allocation to better handle call volumes during high-demand times.

TASK 3 :

Manpower Planning: The current rate of abandoned calls is approximately 30%. Propose a plan for manpower allocation during each time bucket (from 9 am to 9 pm) to reduce the abandon rate to 10%. In other words, you need to calculate the minimum number of agents required in each time bucket to ensure that at least 90 out of 100 calls are answered.

Your Task: What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%?

Ans :

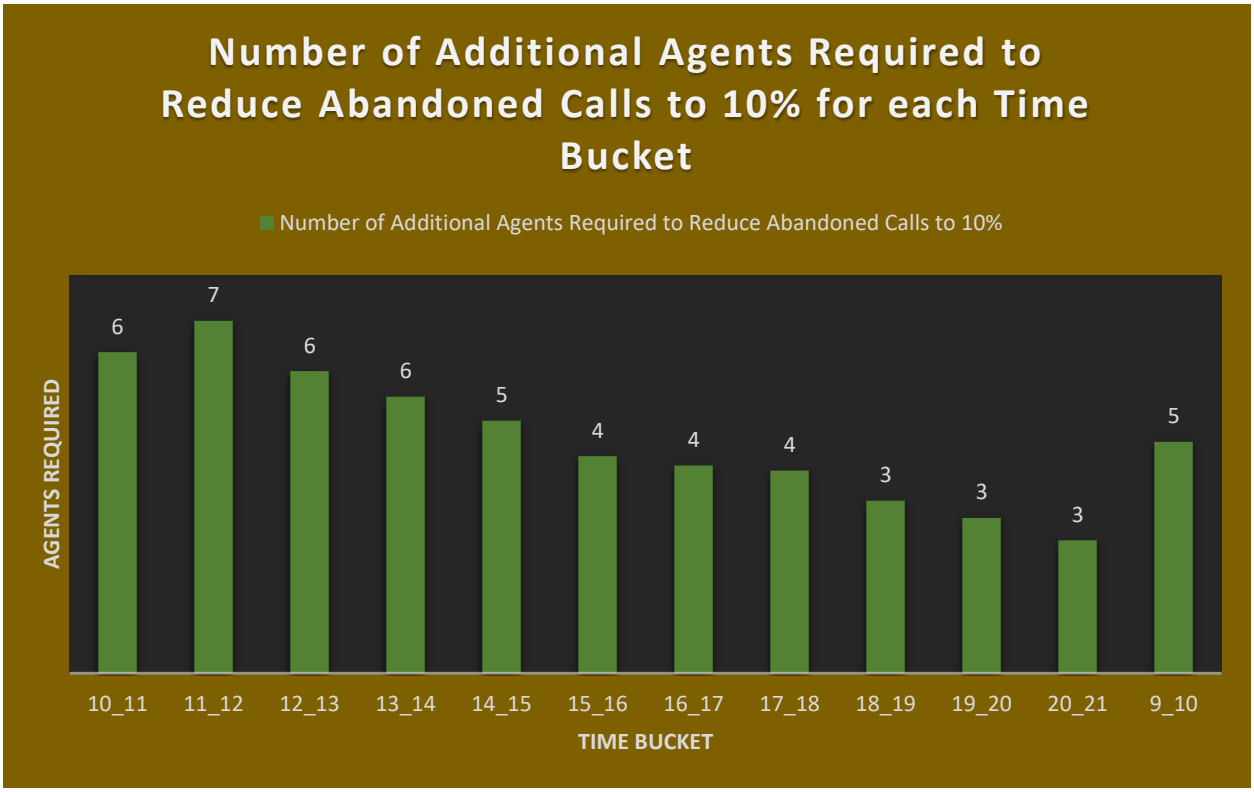
To address the issue of high call abandonment rates, the task involves calculating the minimum number of agents required in each time bucket from 9 am to 9 pm to lower the abandonment rate from 30% to 10%. I utilized a Pivot Table to analyze call data and determine staffing needs for each time period. By ensuring that at least 90 out of every 100 calls are answered, this plan aims to optimize staffing levels and enhance customer service. The Pivot Table helped in accurately segmenting the data and identifying the required number of agents for effective manpower planning. This approach will improve call handling efficiency and reduce customer wait times.

Count of Call_Seconds (s)	Call Status		
Time Bucket	abandon	answered	Grand Total
10_11	6911	6368	13279
11_12	6028	8560	14588
12_13	3073	9432	12505
13_14	2617	8829	11446
14_15	2475	7974	10449
15_16	1214	7760	8974
16_17	747	7852	8599
17_18	783	7601	8384
18_19	933	6200	7133
19_20	1848	4578	6426
20_21	2625	2870	5495
9_10	5149	4428	9577
Grand Total	**34403**	**82452**	**116855**

ASSUMPTIONS		
Agents working Hrs	9	hours
Break	1.5	hours
Agents working Hrs on Floo	7.5	hours
Agents Time spent on calls	**4.5**	hours
Avg Call Volume per day(9	5130	number of
Average call duration (9:00	199	seconds
Total call duration for 70%	284	hours
Currently Working Agents	63	number of
Total call duration for 90%	255	hours
Agents required per day to r	**57**	number of

Count of Call_Seconds (s)	Call Status			
Day	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**
percentage	**29%**	**70%**	**1%**	**100%**

Time Bucket	Abandon Calls (23 days)	Answered Calls (23 days)	Total No of calls for 23 days	Abandon calls per day	Answered calls per day	Total calls per day	Percentage of abandon call	Percentage of answered call	Percentage of Total calls per day	Number of Answered Calls Needed to Achieve a 10% Abandoned Call Rate	Number of Agents Currently Working	Number of Additional Agents Required to Reduce Abandoned Calls to 10%
10_11	6911	6368	13279	300	277	577	52%	5%	11%	520	7	6
11_12	6028	8560	14588	262	372	634	41%	7%	12%	571	8	7
12_13	3073	9432	12505	134	410	544	25%	8%	11%	489	7	6
13_14	2617	8829	11446	114	384	498	23%	8%	10%	448	6	6
14_15	2475	7974	10449	108	347	454	24%	7%	9%	409	6	5
15_16	1214	7760	8974	53	337	390	14%	7%	8%	351	5	4
16_17	747	7852	8599	32	341	374	9%	7%	7%	336	5	4
17_18	783	7601	8384	34	330	365	9%	7%	7%	328	5	4
18_19	933	6200	7133	41	270	310	13%	5%	6%	279	4	3
19_20	1848	4578	6426	80	199	279	29%	4%	5%	251	3	3
20_21	2625	2870	5495	114	125	239	48%	2%	5%	215	3	3
9_10	5149	4428	9577	224	193	416	54%	4%	8%	375	5	5
Grand Total	34403	82452	116855	1496	3585	5081	29%	71%	100%	4573	63	57



The task determined that 57 agents are required to reduce the call abandonment rate from 30% to 10% across various time buckets from 9 am to 9 pm. The purpose of this task is to optimize staffing levels to ensure that at least 90 out of every 100 calls are answered, thereby improving customer service and reducing wait times. By accurately calculating and allocating the necessary number of agents, the company can better manage call volumes during peak periods. This approach helps in maintaining high levels of customer satisfaction and operational efficiency. Ultimately, it ensures that the CX team is well-equipped to handle incoming calls effectively.

TASK 4 :

Night Shift Manpower Planning: Customers also call ABC Insurance Company at night but don't get an answer because there are no agents available. This creates a poor customer experience. Assume 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. The distribution of these 30 calls is as follows:

Your Task: Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.?

Ans :

The task is to propose a manpower plan for each time bucket throughout the day, accounting for 30 additional calls per 100 calls received between 9 am and 9 pm. This plan aims to keep the maximum abandonment rate for night calls at 10% by allocating sufficient agents during the night shift. To achieve this, I used a Pivot Table to analyze call volumes and determine staffing needs, and then created a bar chart to visualize the required number of agents for each time bucket. This approach ensures that the company can handle night-time calls effectively while maintaining high service standards.

Count of Call_Seconds (s)	Call Status			
Day	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
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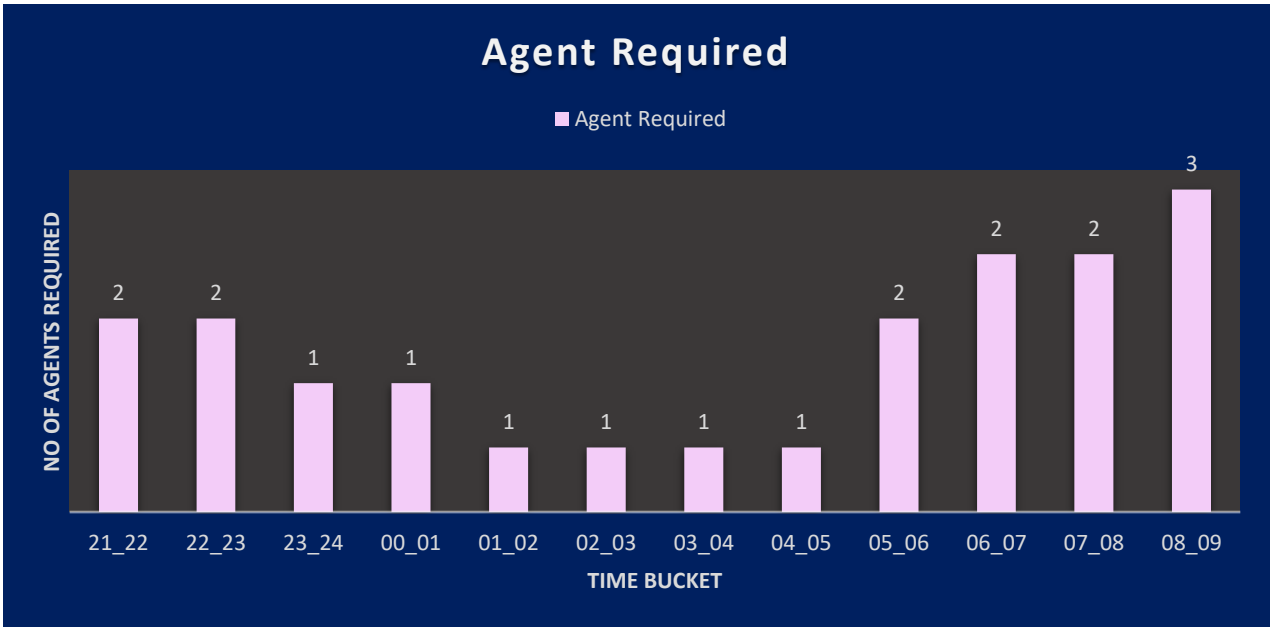
Grand Total	34403	82452	1133	117988
Average	1496	3585	49	5130
percentage	29%	70%	1%	100%

ASSUMPTIONS		
Agents working Hrs	9	Hours
Break	1.5	Hours
Agents working Hrs on Floor	7.5	Hours
Agents Time spent on calls	**4.5**	Hours
Avg Call Volume per day(9:00 AM to 9:00 PM)	5130	number of
Average call duration (9:00 AM to 9:00 PM)	199	Seconds
If support is provided from 9:00 PM to 9:00 AM)		
Avg Call Volume (9:00 PM to 9:00 AM)	1539	Number of
Total Call duration (9:00 PM to 9:00AM)	77	Hours
Agents required (9:00 PM to 9:00AM)	**17**	Number of

Time Bucket	Distribution of 30 calls	Percentage of call distribution	Agent Required
21_22	3	10%	2
22_23	3	10%	2
23_24	2	7%	1
00_01	2	7%	1
01_02	1	3%	1
02_03	1	3%	1
03_04	1	3%	1
04_05	1	3%	1
05_06	3	10%	2
06_07	4	13%	2
07_08	4	13%	2
08_09	5	17%	3
Total	30	100%	17



The task determined that 17 agents are required to handle night-time calls effectively and maintain a maximum abandonment rate of 10%. By proposing a manpower plan for each time bucket, considering 30 additional calls for every 100 calls received during the day, the goal is to ensure that customer calls are answered even during the night shift. The purpose of this task is to improve customer service by allocating adequate

staffing to handle night-time call volumes and reduce abandonment rates. This approach addresses gaps in night-time support and enhances overall operational efficiency. It ensures that customer experience remains positive around the clock.

Results :

The ABC Call Volume Trend Analysis project delivered valuable insights into call handling and staffing needs. The analysis identified peak periods, resulting in a requirement for 57 agents to manage high call volumes during the day. A night shift plan was also established, determining that 17 agents are needed to handle night-time calls and maintain a 10% abandonment rate. The findings were visualized through charts and used to optimize staffing levels, ensuring adequate coverage and improved customer service. This approach enhances operational efficiency by aligning resources with call demand, ultimately leading to a better customer experience and more effective CX team performance.

Excel Project Link