
ABC Call Volume Trend Analysis



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Project Description

A customer experience (CX) team is made up of experts who examine data and consumer input before sharing their findings with the rest of the company. The roles and responsibilities that these teams typically carry out include: Customer experience programmes (CX programmes), 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, and Learning about the Customer Journey.

Customer service representatives, often known as call centre agents or customer service agents, have several job options within a customer experience team. They can play a variety of responsibilities, such as email support, social media support, inbound support, and outbound support.

The call centre tasked with answering consumer incoming calls is referred to as inbound customer support. Inbound calls are incoming voice calls from clients or potential clients of your company that are handled by customer service agents. The approach of appealing, enticing, and satisfying your customers to make them steadfast supporters of your company is known as inbound customer service. You may thrill your clients and transform them into a development engine for your organisation by resolving their difficulties and assisting them in succeeding with your product or service.

DATA UNDERSTANDING

We have been given a dataset of a Customer Experience (CX) Inbound calling team for 23 days to use in our final project. Agent_Name, Agent_ID, and other data Time [time at which a client placed a call in a day], Time_Bucket [for ease, we have also given you with the time bucket], Queue_Time [period for which a customer must wait before they are connected to an agent], Duration (length of time a customer and executives are on call), Call_Seconds (we've also changed that time to seconds for ease of use), and call status (abandon, answered, transferred).

BUISNESS UNDERSTANDING

Advertising is a technique for promoting your company in order to boost sales or raise audience awareness of your goods or services. Your advertising may contribute to the formation of a customer's initial perceptions of your company before they interact with you directly and make a purchase of your goods or services. Businesses may have a local, regional, national, or worldwide target audience, or a combination of them. Thus, they market in various methods.

Internet/online directories, trade and technical press, radio, movies, outdoor advertising, national papers, magazines, and television are a few examples of the different sorts of advertising. The advertising industry is particularly cutthroat since many businesses would spend a lot of money to target the same market. In order to target those audiences from those sorts of media channels and turn them into consumers at a minimal cost, the corporation must use its analytical talents.

PROBLEMS & PLANNING

The following were the tasks that have been provided by the stakeholders to analyze.

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

Task 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,)

Task 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.)

Task 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%.

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. Total days in a month is 30 days.

DATA CLEANING

Before moving on to any data cleaning process, I created a copy of the raw file to avoid any data corruption.

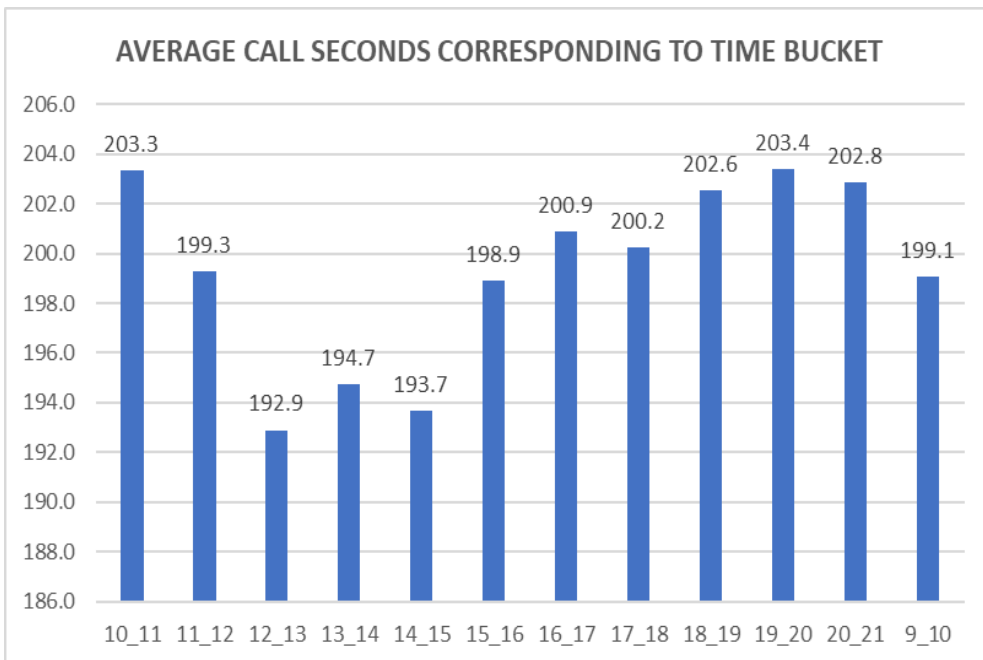
1. For the ease of access, I converted the contents into a table.
2. The columns "Agent_Name" & "Agent_ID" has many N/A values which is directly related to those calls which were abandoned from "Call_Status" column. Therefore, removing them won't be a wise choice.

Approach

As all the data related work has been done, Now I'll be moving towards the Analysis phase and answer the questions asked by the stakeholders.

Task1: Determine the average call duration for each Time_Bucket's worth of incoming calls that agents have received.

Call_Status	answered
Time_Bucket	Average of Call_Seconds (s)
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
9_10	199.1
Grand Total	198.6

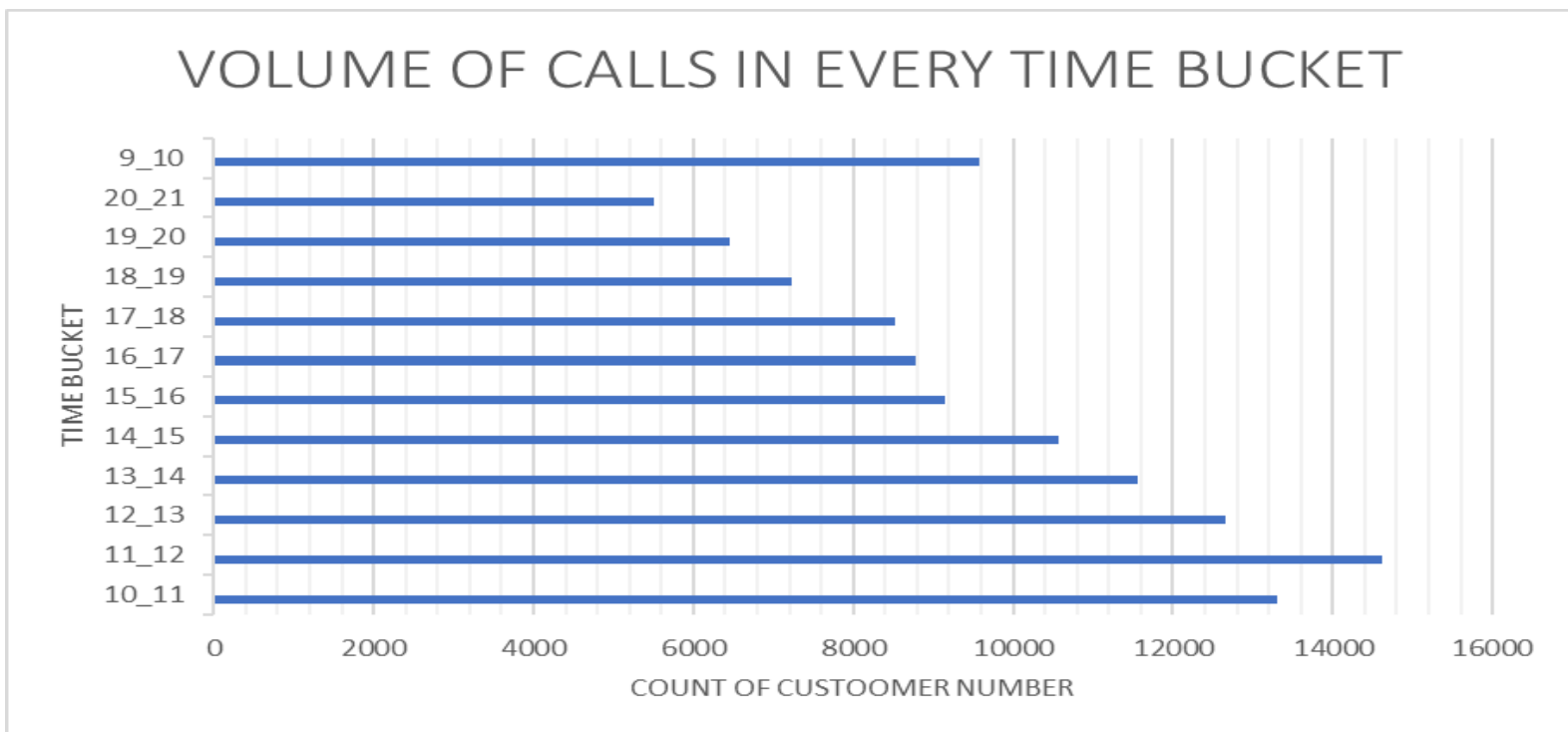


For the creation of the above table and chart, I followed the following process

- I selected the whole table and opted for pivot table and pivot chart.
- Assembled "Call_Status" column to filters, "Time_Bucket" column to Rows and "Call_Seconds" columns to values and converted it from Sum to Average.
- Filtered the call status from All to answered as the question demanded to analyze the incoming calls that agents received.
- 19_20 time bucket handles most of the average calls whereas 12_13 time bucket handles the lowest.

Task 2: Use charts and graphs to display the overall volume and number of incoming calls (number of calls v/s time). Time can be chosen using a bucket form, such as 1-2, 2-3, etc.

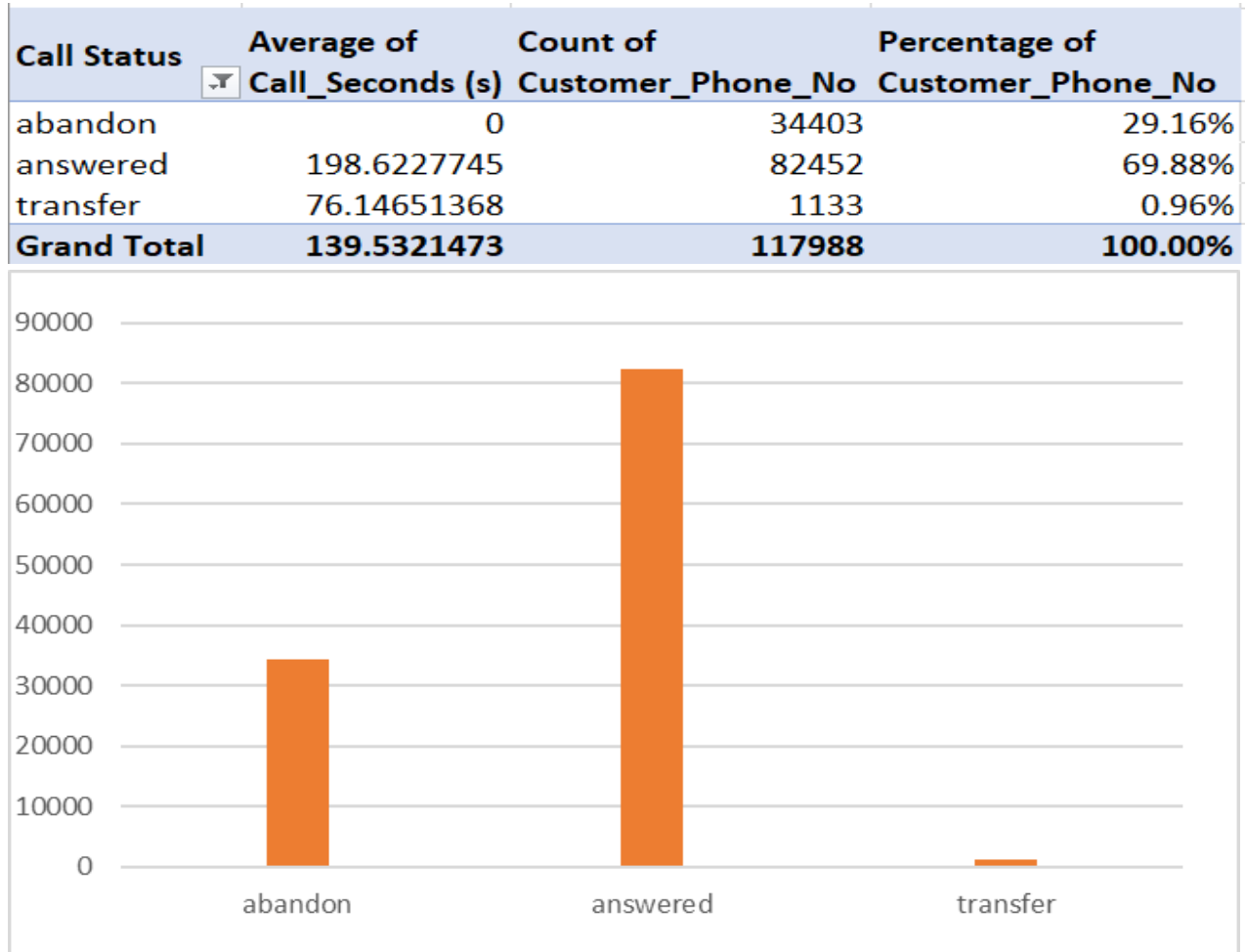
VOLUME OF CALLS IN EVERY TIME BUCKET		
Time Bucke	Count of Customer_Phone_No	Count of Call_Seconds (s)
10_11	13313	11.28%
11_12	14626	12.40%
12_13	12652	10.72%
13_14	11561	9.80%
14_15	10561	8.95%
15_16	9159	7.76%
16_17	8788	7.45%
17_18	8534	7.23%
18_19	7238	6.13%
19_20	6463	5.48%
20_21	5505	4.67%
9_10	9588	8.13%
Grand Total	117988	100.00%



For the creation of the above table and chart, I followed the following process,

- I selected the whole table and opted for pivot chart and pivot table.
- Assembled "Time_Bucket" to Rows, "Customer_Ph_No" and "Call_Seconds" to Values.
- Converted "Customer_Ph_No" from Sum to Count and did the same with "Call_Seconds" as well.
- Also, converted the values of "Count of Call_Seconds" columns into percentage for the better ease of understanding.
- So, from the above plot it can be concluded that 11_12 time bucket experienced the highest call volume of 14626 of almost 12.40% as compared to others.

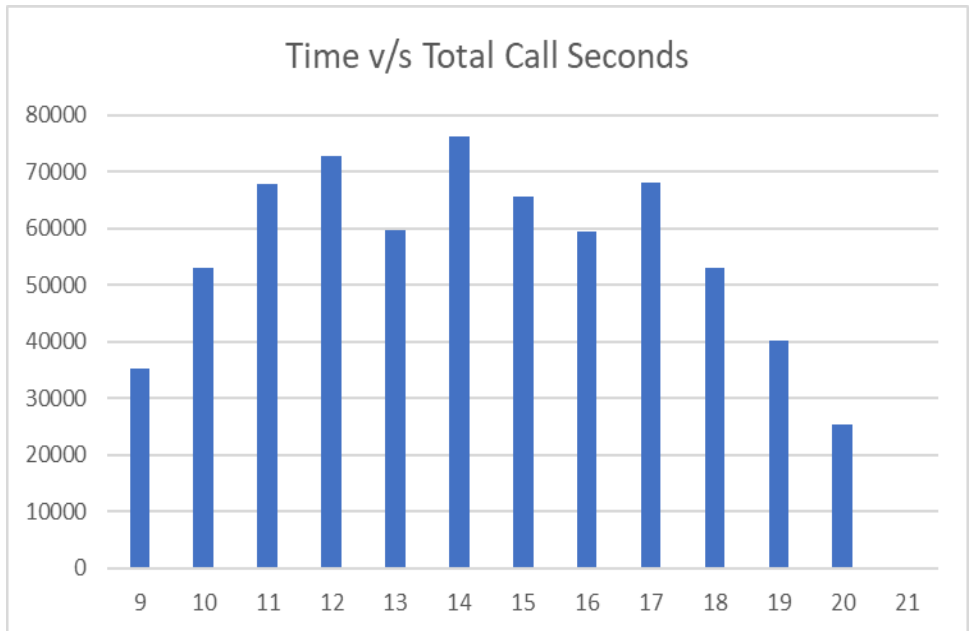
Task 3: As you can see current abandon rate is approximately 30%. Propose a manpower plan required during each time bucket [between 9am to 9pm] to reduce the abandon rate to 10%. (i.e. You have to calculate minimum number of agents required in each time bucket so that at least 90 calls should be answered out of 100.)



- The above plot has been created by inserting a pivot table using the main data. For generating the table, I assembled "Call Status" column to Rows section and "Call Seconds" and twice the "Customer Number" to Values section. Then, I converted the "Call Seconds" to average along with 'Customer Phone Number" to count and the other into percentage.
- From that it can be concluded that the abandoned rate is 29.16% which is equivalent to 30%.
- Now that the details have been achieved, it will be easier to analyze and calculate the next steps.
- To generate a man power plan, I need to separate the "Date and Time" column and store date and time separately to a newly made column named as "Date" and "Time-2".
- I used the =INT(E2) formula to separate the date first and filled the rest of the cells accordingly. Similarly, I used =E2-F2 to paste the time and then filled the rest of the cells.

- Now that the columns were created, I'll select "Date & Time", "Time2", "Time Bucket", "Duration" and "Call Seconds" along with the newly created columns "Date", "Time-2" and generate a pivot table.
- After assembling "Date" column to filters section, "Time2" to Rows and "Call Seconds" to values, I get the following table.

Date	01-01-2022
Time	Sum of Call_Seconds (s)
9	35313
10	53087
11	67751
12	72680
13	59693
14	76137
15	65689
16	59464
17	68155
18	53096
19	40141
20	25281
21	177
Grand Total	676664



- Selecting Date as 01-01-2022 as a reference, the above table provided total call seconds as 676664.
- Now to carry out analysis, I'll be creating a summarized form of the above table.

Summarized Form	
Date	01-01-2022
Total Seconds Per Day	676664
Total Hours Per Day	187.96
Total Agents Present for 60%	42
Total Agents Required for 90%	63

- For the summarized form table, I selected the date as a reference.
- For "Total Hours", I converted the "Total Seconds" into hours by dividing the value with 3600.
- For "Total Agents Present For 60%", the "Total Hour" is being divided by 4.5 which is total working hour of a single person. The results gives total number of agents present.
- Now to calculate "Total Agents Present For 90%", I divided the above result with 60 and multiplied it with 90. The result will provide the total agents required to achieve 90% of success rate.

- Now that the total agents required to achieve 90% rate has been generated, next I'll be distributing the number of agents required in each time bucket.

Agents Required For 90%		
Time Bucket	Call Seconds	Agents Required
10_11	11.28%	7
11_12	12.40%	8
12_13	10.72%	7
13_14	9.80%	6
14_15	8.95%	6
15_16	7.76%	5
16_17	7.45%	5
17_18	7.23%	5
18_19	6.13%	4
19_20	5.48%	3
20_21	4.67%	3
9_10	8.13%	5
Grand Total	100.00%	64

- I generated a pivot table for which I selected "Date & Time", "Time2", "Time Bucket", "Duration" and "Call Seconds" along with "Date", "Time-2".
- I assembled "Time Bucket" to Rows and "Call Seconds" to Values and converted it to percentage.
- Next, I added a new column and named it as "Agents Required For 90%" and used $=\text{ROUND}((E21*63), 0)$ formula to generate the number of agents corresponding to time bucket.
- Therefore, from the above process the manpower has been allocated and now a success rate of 90% can be achieved.

Task 4: Customers could have a negative experience with this insurance firm if they phone ABC Insurance firm at night and don't get through since no agents are available to respond. Assume that for every 100 calls made between 9 a.m. and 9 p.m., the client additionally made 30 calls between 9 p.m. and 9 a.m., with the distribution of those 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

Now suggest the personnel schedule needed for each block of time in a day. The assumed maximum abandonment rate is 10%.

TOTAL CALL STATS

Count of Call_Status	Column Labels			
Date	abandoned	answered	transfer	Grand Total
01-01-2022	684	3883	77	4644
02-01-2022	356	2935	60	3351
03-01-2022	599	4079	111	4789
04-01-2022	595	4404	114	5113
05-01-2022	536	4140	114	4790
06-01-2022	991	3875	85	4951
07-01-2022	1319	3587	42	4948
08-01-2022	1103	3519	50	4672
09-01-2022	962	2628	62	3652
10-01-2022	1212	3699	72	4983
11-01-2022	856	3695	86	4637
12-01-2022	1299	3297	47	4643
13-01-2022	738	3326	59	4123
14-01-2022	291	2832	32	3155
15-01-2022	304	2730	24	3058
16-01-2022	1191	3910	41	5142
17-01-2022	16636	5706	5	22347
18-01-2022	1738	4024	12	5774
19-01-2022	974	3717	12	4703
20-01-2022	833	3485	4	4322
21-01-2022	566	3104	5	3675
22-01-2022	239	3045	7	3291
23-01-2022	381	2832	12	3225
Grand Total	34403	82452	1133	117988
Average 5129.91304				

Average of daily calls	5130
Average of daily calls at night	1539
Additional Call Seconds	305645 sec
Additional Call Hour	84.9015 hr
To achieve 90% work rate	76 hr
Additional Agents Required	17 agents

- The above table depicts the dates along with the total value of the call status along with the average of the daily calls.
- It has been generated by selecting the specific columns and then opting for pivot table from the main data sheet.
- Now according to question if 100 calls were made during day is equivalent to 100%, therefore the daily average calls at night corresponding to 100 calls is equivalent to 30%.
- Hence, 30% of average daily call i.e., 5130 provides the value of the average daily calls at night i.e., 1539.
- Now to get the additional call seconds that is required to attend the calls, I took the average daily night call value and multiplied with the total average call seconds i.e., 198.6. The result was 305645 seconds
- Converting the into hours, I get 84.9 hours.
- Now, to achieve 90% of the success rate, I multiplied the value with 0.9 and got the result i.e., 76 hours.
- As 4.5 hrs out of 7.5 hrs is the total working hour per person, therefore at night to achieve 90% work rate, total additional manpower required were 17.

Now that the total agents required has been achieved, hence for the next part, I'll be distributing the agents as per the number of calls corresponding to the time distribution.

Distribution of Calls For Night			
Time Bucket	Call Distribution	Time Distribution	Agents Required
9_10	3	10	2
10_11	3	10	2
11_12	2	15	1
12_1	2	15	1
1_2	1	30	1
2_3	1	30	1
3_4	1	30	1
4_5	1	30	1
5_6	3	10	2
6_7	4	7.5	2
7_8	4	7.5	2
8_9	5	6	3
Grand Total	30	201	17

- The table has been manually created in a new sheet (*named task_4.2 respectively*) by copying and pasting the “Time Bucket” and “Call Distribution” columns.

- The additional column of “Time Distribution’ is derived from the “Call distribution” column by dividing the particular call of that time bucket from the total call distributed values i.e., 30.

- Similarly, the additional column of “Agents Required” is derived from the previous sheet (*named as task_4.1*) by dividing the total agents with the particular time distributed corresponding to the time bucket.

Hence, following up this method I've successfully achieved 90% success rate and distributed the workforce accordingly.

INSIGHTS

During this project, I've learned a lot about the important function an analyst plays in the customer service department thanks to this assignment. It is now obvious that businesses prioritize increasing customer satisfaction by putting effective customer handling methods into place. The analyst's participation is crucial in spotting patterns in the data, analyzing it, and making suggestions that may be put into practice to improve customer service operations. Through this experience, I have personally seen the critical role that an analyst plays in enhancing the client experience and encouraging steadfast loyalty.

An excellent solution that applies AI to address consumer inquiries is the Interactive Voice Response (IVR) system. The IVR system may use AI capabilities to recognize the specific issues that consumers have and route their calls to the appropriate agents for prompt resolution. By effectively routing calls, cutting down on wait times, and offering individualized support, this technology guarantees a smooth client experience. The IVR system is a famous instrument in the field of customer service since it plays a significant role in boosting customer satisfaction and expediting customer care procedures. The pre-calculated time buckets and call durations transformed into seconds made it easier to analyze the data. This conversion saved time and effort by enabling computations to be completed more quickly and effectively. Analysts could concentrate on evaluating the data rather than wasting time on manual conversions because the data was easily accessible in a standardized format. Overall, the productivity and accuracy of the analysis of the supplied data were improved by the simplified approach.

I have also looked at behavioral analytics, a discipline that examines consumer behavior to find trends, preferences, and possible ways to enhance the customer experience. I have learned a lot about how customers behave and how to spot patterns that might guide company strategy by exploring this area. Using this strategy, I can more successfully modify products and services to match the demands of customers, improving the entire customer experience. Businesses may use behavioral analytics to streamline processes, create targeted marketing efforts, and eventually forge deeper and more meaningful relationships with their consumers.

This project has been very helpful to me since it has given me important information and profound insights into the complex processes involved in customer service. I now have a thorough grasp of how to maximize client satisfaction in my capacity as an analyst. I have been able to learn the subtleties of customer interactions, pinpoint areas for development, and put practical plans into action to improve their experience. Overall, this project has been a priceless learning experience that has equipped me with the knowledge and abilities needed to provide top-notch customer care and support the development of any organization.

RESULTS

According to analysis, client calls are less common in the evening, giving the business an opportunity to optimize its employees. Resources can be better allocated by lowering the number of agents devoted to answering calls during this period. This tactical choice promotes effective staff utilization, increasing production overall while also reducing expenses. The business should hire 17 customer service representatives who are only accessible during those hours to meet the night shift.

One solution is to move certain daytime employees to the night shift in order to provide continuous coverage and effective call handling throughout the day. By doing this, the job may be divided fairly, enabling efficient operations and prompt customer service. With this change, availability would be constant, productivity would increase, and potential service gaps would be minimized.

The business can optimize phone handling during peak hours by employing staggered shift scheduling, such as scheduling some personnel from 5 am to 2 pm and others from 2 pm to 11pm night. Maximum call coverage is made possible by using this method, which also guarantees that more calls are immediately returned.

The organization may arrange its staff into three shifts to assure 24-hour availability. This section enables agents to respond to consumer questions and concerns round-the-clock. The organization can give continuous service and uphold high levels of client satisfaction by putting in place this 24-hour plan.

It is essential to recognize the existence of outliers in the data during the analysis. Eliminating these outliers could provide inconsistent results and conclusions since they might have had an impact on the findings. When analyzing the results of the study and coming to any conclusions, it is crucial to take the potential effects of outliers into account.

The organization may create practical plans that optimize personnel allocation by analyzing the information obtained. In order to maximize production and efficiency, this entails allocating individuals to the appropriate jobs and areas depending on their qualifications and availability. These insights also assist to improve customer service efficiency by highlighting areas where adjustments may be made, such as reducing procedures, introducing new technology, or giving customer care staff more training.

By detecting high demand periods and modifying employee numbers accordingly, the business may further assure continuous availability to meet client demands. This will guarantee that customers always receive timely and satisfactory help. Overall, the organization is able to enhance operational performance and deliver great customer service thanks to these initiatives developed via analytical research.

DRIVE LINK

Folder Name: *ABC Call Volume Trend Analysis*

Link: <https://drive.google.com/drive/folders/1gi7liL7XDvDzuogPZE3C62HkrgGC3U0d>

1. Sub-Folder Name: *Presentation Files*

Link: <https://drive.google.com/drive/folders/1qgzjKo1c0t--D8JIE2Soa9vC9AnQaUnP>

Report File Name: *project_8*

Video Presentation File Name: *video_presentation_8*

2. Sub-Folder Name: *Analysis Files*

Link: https://drive.google.com/drive/folders/1QO9kyOuUn6A2Y_BaMq38uSK5t2JvC-zm

Cleaned Data File Name: *Call_Volume_cleaned*

Raw Data File Name: *Call_Volume_Trend_Analysis_Project_9*