

ABC Call Volume Trend Analysis

Project Description:

The project involves analysing the inbound calling data of a company's CX team over a span of 23 days. The dataset includes details such as agent names and IDs, queue time, call duration, and call status. The goal is to derive insights into customer behaviour satisfaction levels, and call volume trends. This analysis will aid in optimizing the customer support process, improving resource allocation, and assessing the effectiveness of advertising efforts in driving customer inquiries.

Data cleaning and exploration: obtain the dataset and explore it to understand its structure, features and datatypes. Identify the target variable and distribution of each feature to gain insights into the data. cleaning dataset by handling missing values, removing duplicates, and addressing any inconsistencies.

Descriptive Analysis: Conduct descriptive analysis to understand basic statistics and distribution of variables, visualise the data using plots and charts to identify patterns and detect outliers.

Agent Performance Analysis: Evaluate the performance of individual agents based on metrics such as average call duration, call abandonment rates, and customer satisfaction ratings. Identify top-performing agents and areas for improvement.

Queue Time Analysis: Investigate the average queue time for incoming calls. Assess the impact of queue time on customer satisfaction and call abandonment rates.

Call Status Analysis: Analyse the distribution of call statuses and their implications for customer experience. Identify reasons for call abandonment and explore strategies to reduce abandonment rates.

Correlation with Advertising Efforts: Explore the correlation between call volume and advertising efforts. Assess the effectiveness of different marketing channels in driving customer inquiries and adjust advertising strategies accordingly.

Insights and Recommendations: Based on the analysis results, recommendations will be made regarding which features to improve to optimize the customer support process, improve resource allocation, and enhance the effectiveness of advertising efforts.

Report and Presentation: prepare a comprehensive report documenting the analysis methodology, findings, and recommendations. Provide actionable insights to relevant stakeholders in a clear and concise manner.

Tech Stack use:

MS Excel- A spreadsheet editor software used by professionals and businesses to enter data in a table format, perform data manipulations, computations, modelling, advanced analytics, plot graphs, etc

Hyperlink

<https://drive.google.com/file/d/1sXRQLNvT0-CIqJ8MEcqtCCLn9HiccufC/view?usp=sharing>

Identify missing data and deal with it appropriately

First step is to remove duplicates, there were **941 duplicates** found and removed

Wrapped by has 40000+ missing values, we check for Call status column for corresponding values of missing cells and replace them accordingly by using the below formula.

If the call is either answered or transferred we will replace it by Agent else if it is abandoned it will be Auto Wrapped

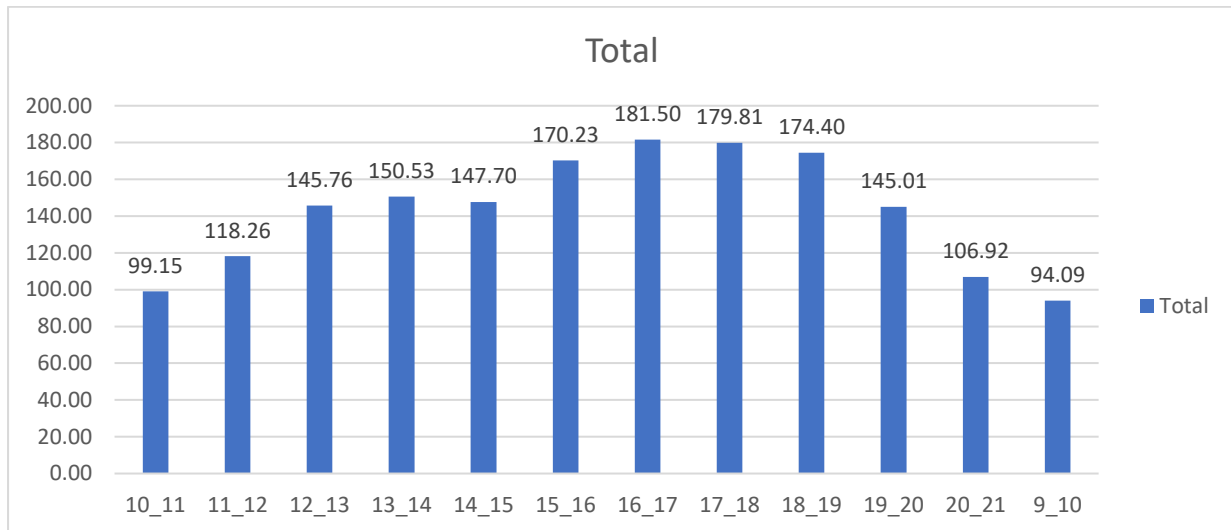
=IF(ISBLANK(K3),IF(OR(J3="answered",J3="transfer"),"Agent","AutoWrapped"),K3)

ion(hh:mm:ss)	Call_Seconds	Call_Stat	Wrapped_B	Wrapped_B	Ringi	IVR_Duratic
00:01:36	96	answered	Agent	Agent	YES	00:00:16
00:02:20	140	answered	Agent	Agent	YES	00:00:26
00:01:25	85	answered	AutoWrapped	AutoWrapped	YES	00:00:16
00:01:31	91	answered	Agent	Agent	YES	00:00:25
00:02:45	165	answered	Agent	Agent	YES	00:00:23
00:00:00	0	abandon		AutoWrapped	YES	00:00:16
00:01:25	85	answered	AutoWrapped	AutoWrapped	YES	00:00:13
00:00:00	0	abandon		AutoWrapped	YES	00:00:17
00:01:05	65	answered	Agent	Agent	YES	00:00:20
00:03:00	180	answered	AutoWrapped	AutoWrapped	YES	00:00:44
00:01:48	108	answered	Agent	Agent	YES	00:00:15
00:03:06	186	answered	Agent	Agent	YES	00:00:16
00:00:00	0	abandon		AutoWrapped	YES	00:00:40
00:01:40	100	answered	AutoWrapped	AutoWrapped	YES	00:00:42
00:01:15	75	answered	AutoWrapped	AutoWrapped	YES	00:00:19
00:00:00	0	abandon		AutoWrapped	YES	00:00:18
00:00:00	0	abandon		AutoWrapped	YES	00:00:17
00:04:03	243	answered	AutoWrapped	AutoWrapped	YES	00:00:15
00:04:10	250	answered	Agent	Agent	YES	00:00:19

Task 1: What is the average duration of calls for each time bucket? Determine the average duration of all incoming calls received by agents. This should be calculated for each time bucket.

Row Labels	Average of Call_Seconds (s)
10_11	99.15
11_12	118.26
12_13	145.76
13_14	150.53
14_15	147.70
15_16	170.23
16_17	181.50
17_18	179.81
18_19	174.40
19_20	145.01
20_21	106.92
9_10	94.09

Grand Total 140.6539168



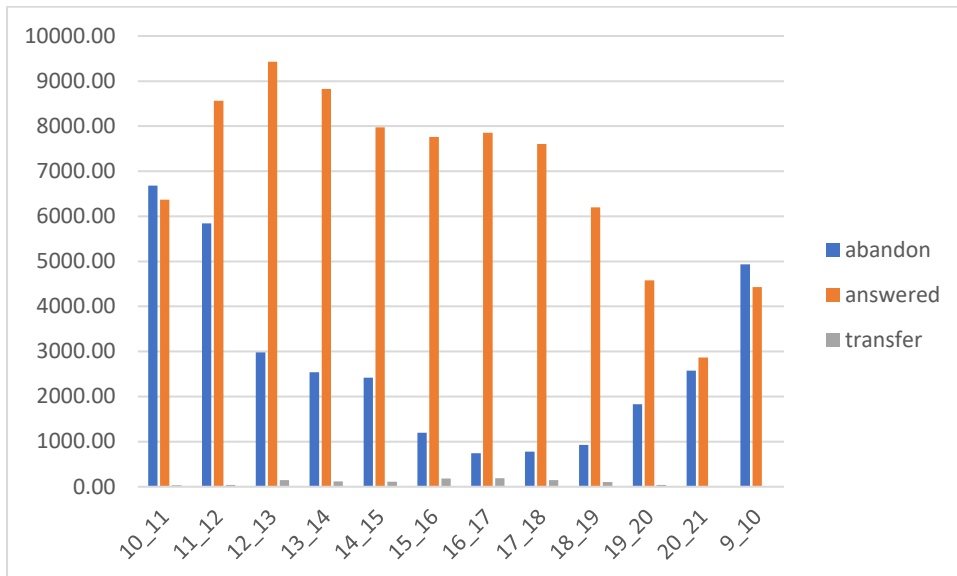
The average duration is 140 seconds and the duration during the start of the shift is low, it steadily increases around the mid-day and gradually decreases again by end of the shift.

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.).

The number of calls incoming increases during the day and comes down by the evening, we can also see the percentage of answered and abandoned calls are both almost same during the day this is because the agents are busy on a ongoing call while incoming new calls are still coming and agents are not able to answer them and as by the midday the answered calls increases and the abandoned calls decreases this is because the call duration decreases and the agents can answer more calls.

Count of Call_Status	Column Labels			Grand Total
Row Labels	abandon	answered	transfer	
10_11	6679	6368	34	13081
11_12	5846	8560	38	14444
12_13	2983	9432	147	12562
13_14	2541	8829	115	11485
14_15	2423	7974	112	10509
15_16	1196	7760	185	9141
16_17	744	7852	189	8785
17_18	779	7601	150	8530
18_19	930	6200	105	7235
19_20	1829	4578	37	6444

20_21	2575	2870	10	5455
9_10	4937	4428	11	9376
Grand Total	33462	82452	1133	117047



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.

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.

By the above assumptions we found out **the time spent by each agent per day on calls in 4.5** There are **23 unique days in the dataset** hence **total time spent by the agent on calls is 103.5** First we find out the percentage of current abandon rate and answered rate, currently there is 30% abandon rate and at this rate the sum of call duration is recorded. We find the total time in hours and divide that by time spent by agent to find the number of agents at the current abandon rate.

So for 30% abandon rate the of answered calls is 70 and hence by using the formula we can find the no of agents required so that 90 out of 100 calls are answered giving us a 10% abandon rate so the **total no of agents required are 57 at 10% abandon rate** and distributing this total across different time buckets we have agents required for each time bucket at 10% abandon rate.

47				
48	Row Labels	Average of Call_Seconds (s)	Sum of Call_Seconds (s)	Count of Call_Status
49	abandon	0.00	0.00	29%
50	answered	198.62	16376845.00	70%
51	transfer	76.15	86274.00	1%
52	Grand Total	140.65	16463119.00	100.00%
53				

55					
56	total seconds		16463119		
57	time spent on calls by single agent		103.5	70	44
58	total time in hours		4573.09	90	57
59	no of agents at present 30% abandon rate		44.00		
60					
61					
62					
63					
64	Row Labels	Sum of Call_Seconds (s)	distribution	30% abandon	10% abandon
65	10_11	8%	0.08	3	4
66	11_12	10%	0.1	4	6
67	12_13	11%	0.11	5	6
68	13_14	11%	0.11	5	6
69	14_15	9%	0.09	4	5
70	15_16	9%	0.09	4	5
71	16_17	10%	0.1	4	6
72	17_18	9%	0.09	4	5
73	18_19	8%	0.08	4	5
74	19_20	6%	0.06	3	3
75	20_21	4%	0.04	2	2
76	9_10	5%	0.05	2	3
77	Grand Total	100.00%		44	57

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.

We start by calculating the no of calls per day, and then for every 100 calls in the day there is 30 calls in the night which is 30% of day calls hence we take **30% of total calls to calculate manpower for the night**

From the first task we found out average duration of a call is **140 seconds** hence total duration will be **140*30% of morning calls**.

Then we covert the duration to hours by dividing it by 3600

Since each agent spends 4.5 hrs per day, no of agents will be call duration in hours/4.5

Which is **13, this the manpower at 30% abandon rate**.

Similarly for **10% abandon rate the manpower required during the night is 17** and this shall be divided to each time bucket as per the suggested distribution

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	

97			
98	Average no of calls per day		5089
99	30% of morning calls		1527
100			
101	total call duration of the calls		215264.7
102	call duration in hours		60
103	No of agents at 30% abandon rate		13
104	No of agents at 10% abandon rate		17
105			
106			
107		70	13
108		90	17

109						
81						
82	Row Labels	Count of Call_Seconds (s) during day	distribution of 30 calls during night	in decimal	Manpower at 30%	manpower at 10%
83	10_11	13081.00	3	0.1000	1	2
84	11_12	14444.00	2	0.0667	1	1
85	12_13	12562.00	2	0.0667	1	1
86	13_14	11485.00	1	0.0333	0	1
87	14_15	10509.00	1	0.0333	0	1
88	15_16	9141.00	1	0.0333	0	1
89	16_17	8785.00	1	0.0333	0	1
90	17_18	8530.00	3	0.1000	1	2
91	18_19	7235.00	4	0.1333	2	2
92	19_20	6444.00	4	0.1333	2	2
93	20_21	5455.00	5	0.1667	2	3
94	9_10	9376.00	3	0.1000	1	2
95	Grand Total	117047.00				

Result:

Understanding customer Behaviour: Analysing inbound calling data can provide insights into customer behaviour, preferences, and pain points. By understanding why customers are reaching out, businesses can tailor their products, services, and support processes to better meet customer needs.

Optimizing Customer Support Processes: by examining metrics such as queue time, call duration, and call statuses, organizations can identify bottlenecks and inefficiencies In their customer support processes. This enables them to streamline operations, reduce wait times, and improve overall customer satisfaction.

Improving Agent Performance: Evaluating agent performance based on metrics such as call duration, call abandonment rates, and customer satisfaction ratings allows organizations to identify top-performing agents and areas for improvement, this can inform training programs, coaching sessions, and performance incentives to enhance the quality of customer interactions.

Resource Allocation and Capacity Planning: Understanding call volume trends helps organizations effectively allocate resources and plan staffing levels to meet demand. By having the right number of agents available during peak call times, businesses can minimize wait times, reduce call abandonment rates, and ensure a positive customer experience.

Assessing Advertising Effectiveness: By correlating call volume with advertising efforts, organizations can assess the effectiveness of different marketing channels in driving

customer inquiries. This enables them to allocate advertising budgets more efficiently and focus on strategies that generate the highest return on investment.

Data-Driven Decision-Making: By leveraging data analytics to derive insights from inbound calling data, organizations can make more informed, data-driven decisions across various aspects of their business, including customer support, marketing, and resource management. This empowers organizations to continuously optimize process, enhance customer satisfaction, and drive business growth.