



ABC CALL VOLUME TREND ANALYSIS

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PROJECT DESCRIPTION

- This project focuses on analyzing inbound customer support call data over a 23-day period to gain insights into customer experience (CX) trends. The dataset includes key metrics such as agent details, queue time, call duration, time of call, and call status (answered, abandoned, or transferred).
- Inbound customer support is a key function, focusing on handling calls from existing and prospective customers to attract, engage, and retain them. This project aims to provide data-driven insights that can optimize the efficiency and effectiveness of inbound call operations.
- My objective is to leverage data analytics to identify patterns in call volume, agent performance, and customer wait times to enhance CX strategies and improve customer satisfaction.

APPROACH

- Firstly I downloaded the dataset
- Gained an understanding of the data
- Cleaned and handled missing data
- Performed the tasks and found insights from the clean data
- Data visualisation was done through graphs and charts

TECH STACK

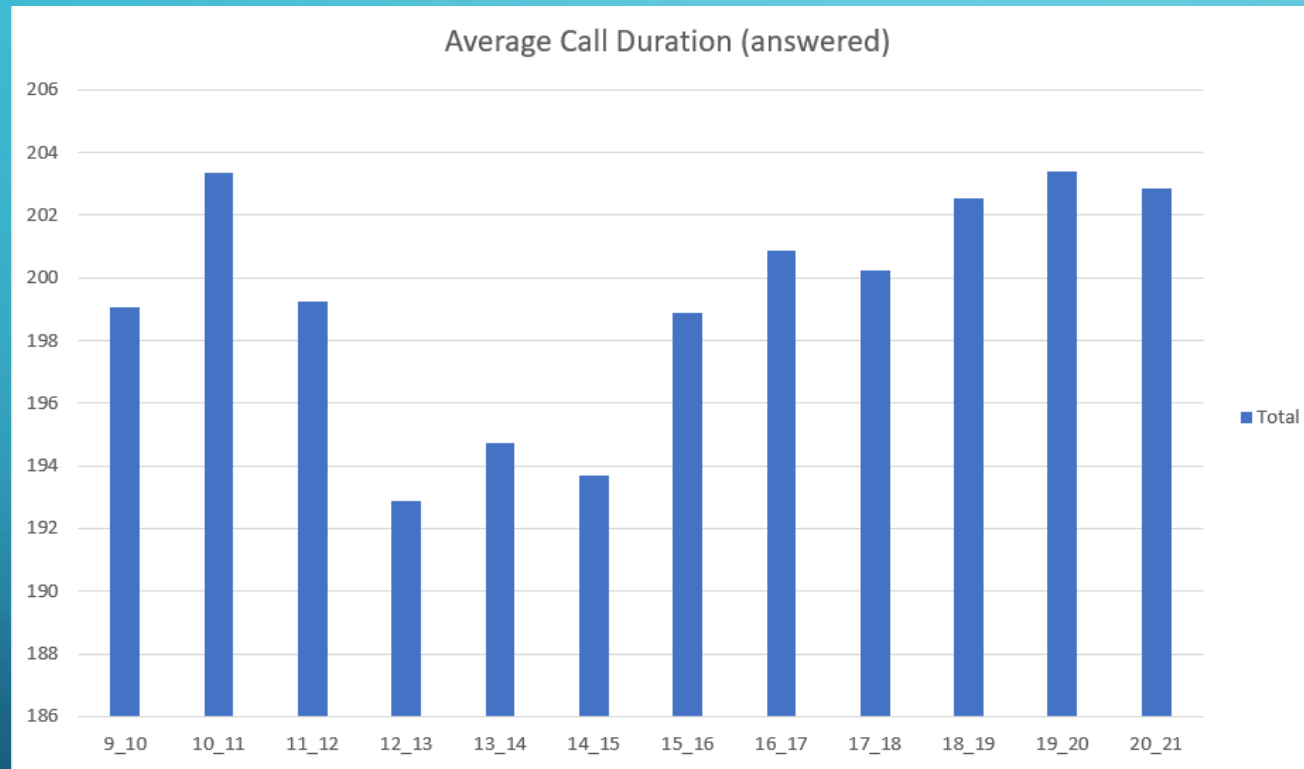
- Microsoft Excel
- Microsoft Power Point

DATA CLEANING

- The dataset provided contains 13 columns and 117989 rows.
- The *Wrapped_By* column contains blank cells.
- *Call_Status* and *Wrapped_By* are adjacent columns.
- *Agent_Name* and *Agent_ID* are also adjacent.
- Calls marked as "**Abandon**" in the *Call_Status* have #N/A for *Agent_Name* and *Agent_ID*, meaning no agent handled them.
- Calls marked as "**Answered**" always have an assigned *Agent_Name* and *Agent_ID*.
- If *Call_Status* = "**Abandon**", fill the blank *Wrapped_By* values with "**Call Abandoned**".
- If *Call_Status* = "**Answered**", fill the blank *Wrapped_By* values using **mode imputation** with "**Agent**" (since an agent must have ended the call)

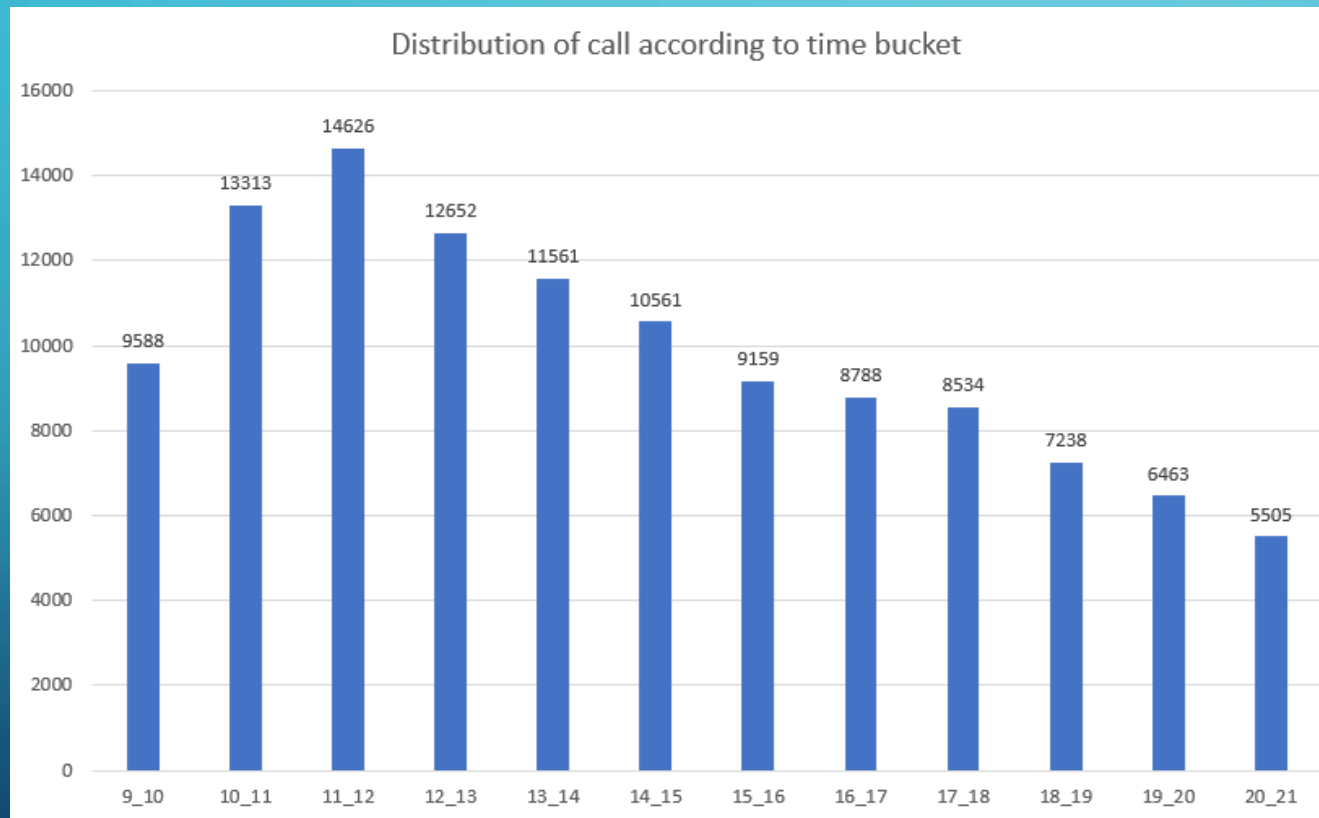
INSIGHTS

Task 1: What is the average duration of calls for each time bucket?



- The maximum average call duration is of time bucket 7pm-8pm.
- The least average call duration is observed during 12pm-1pm.

Task 2: 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.



- The highest number of calls (14,626) occurs between 11am-12pm, indicating this is the busiest hour.
- After 12pm, call volume starts decreasing, with a steady decline throughout the afternoon and evening.
- The lowest number of calls (5,505) is recorded between 8pm-9pm suggesting reduced activity in the late evening.
- There is a sharp increase in calls from 9am-11am indicating a busy start to the day, possibly due to business-related activities.

Task 3: What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%?

Procedure:

- A Pivot Table was created to analyze call trends over 23 days, identify peak hours, and understand abandonment patterns.
- Using the AVERAGE() function, the total number of incoming calls per day across all statuses was found to be 5,130 calls/day.
- To estimate time needed to answer 90% of calls we multiply total calls per day(5130) into average time taken to answer a call (199 secs) into the target answer rate (90% i.e. 0.9) and divide this by 3600 to convert to hours.
- $5130 * 199 * 0.9 \div 3600 = 255$ hours

- To calculate the number of agents required we divide the total time needed to answer calls(255 hours) by the total working hours per agent (4.5 hours)
- $255 \div 4.5 = 57$ agents
- To find the minimum agents required per time bucket, the total agents (57) were distributed based on the percentage of total call seconds in each time bucket.
- Each time bucket's percentage of total call seconds was multiplied by 57 (total agents required) to determine the minimum agents needed for that hour.
- Time buckets with higher call volumes receive more agents and the time buckets with lower call volume receive fewer agents.
- This ensures efficient staffing while minimizing idle time and customer wait time.

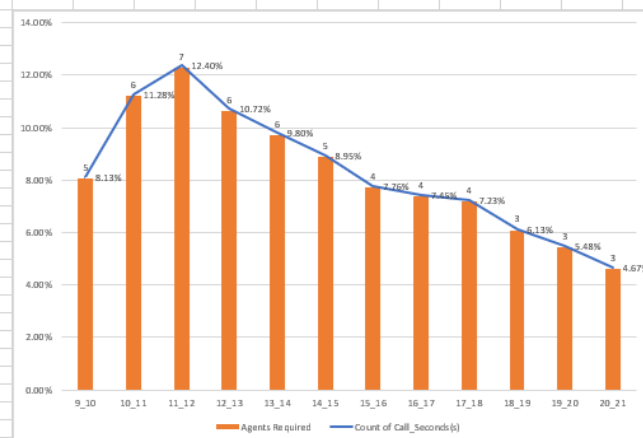
Task 3: What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%?

Count of Duration(hh:mm:ss)	Column La	abandon	answer	transfe	Grand Total
Row Labels					
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 number of call status:		1496	3585	49	5130
Call status in %		29%	70%	1%	

Assumptions:

Working hours in a day	9
Break hours	1.5
Actual working hours	7.5
Occupancy	60%
Total working hours	4.5
Total number of incoming calls per day	5130
Average time taken to answer a call (seconds)	199
Time needed to answer 90% of the calls (hours)	255
Agents required	57

Time Buck	Count of Call_Seconds (s)
9_10	8.13%
10_11	11.28%
11_12	12.40%
12_13	10.72%
13_14	9.80%
14_15	8.95%
15_16	7.76%
16_17	7.45%
17_18	7.23%
18_19	6.13%
19_20	5.48%
20_21	4.67%
Grand Total	100.00%



Time bucket	Count of Call_Sec	Agents Req
9_10	8.13%	5
10_11	11.28%	6
11_12	12.40%	7
12_13	10.72%	6
13_14	9.80%	6
14_15	8.95%	5
15_16	7.76%	4
16_17	7.45%	4
17_18	7.23%	4
18_19	6.13%	3
19_20	5.48%	3
20_21	4.67%	3
Total		57

- The 57 agents required are strategically distributed across time buckets based on call volume trends to ensure 90% of calls are answered, significantly reducing the abandon rate from 30% to 10%.
- This analysis enables efficient workforce allocation, ensuring better customer experience and lower wait times.

Task 4: Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%

Procedure:

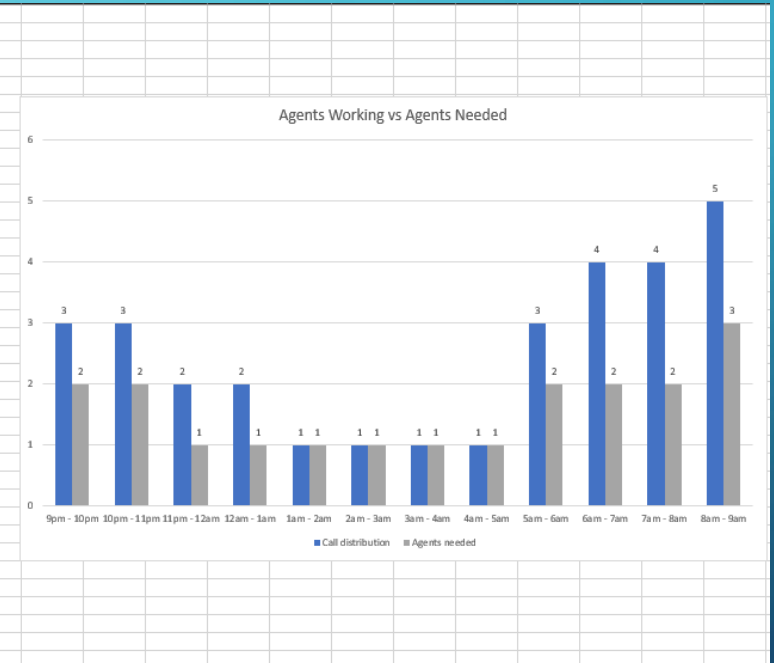
- We know that the average total calls are 5130. 30% calls are made at night after 9 pm to 9 am.
- So, average calls made at night is $5130 * 0.3$ which is 1539.
- We calculate total hours required to handle night calls by multiplying average calls made at night (1539) into average time taken to answer a call (199) into the target answer rate (90% i.e. 0.9) and divide this by 3600 to convert it into hours.
- $1539 * 199 * 0.9 \div 3600 = 77$ hours

- By using the assumptions,
- To determine the number of agents required we divide the total hours required to handle night calls (77 hours) by the effective working hours per agent($7.5 * 60\% = 4.5$ hours).
- $77 \div 4.5 = 17$ agents
- Now, to allocate agents across each time bucket we use the distribution of calls across different time buckets which is provided to us.
- Each time bucket has a call distribution ratio.
- The ratio is calculated as calls in time bucket divided by total night calls (30)
- The ratio helps allocate agents proportionally based on the call distribution for each time bucket.
- Next, the number of agents for each time bucket is obtained by multiplying this ratio with total agents required (17)
- The total number of agents needed is found to be between 17 and 19.

Task 4: Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

Count of Duration(hh:mm:ss)	Column Labels			
Row Labels	abandon	answered	transfer	Grand Total
01-Jan	684	3883	77	4644
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Grand Total	34403	82452	1133	117988
Average number of call status:	1496	3585	49	5130
Call status in %	29%	70%	1%	
Agents working hours:	4.5			
Average call time per agent (second)	199			
Average number of calls at night	1539			
For 90% call rate at night	77			
Total number of agents required	17			

Assumptions:			
Working hours in a day			9
Break hours			1.5
Actual working hours			7.5
Occupancy			60%
Total working hours			4.5
Average calls coming per day			
Average time taken to answer a call (sec)			199
Average number of call at night			1539
Hours required			
Agents required			17
Time bucket			
Call distribution	Time distribution	Agents needed	
9pm - 10pm	3	0.1	2
10pm - 11pm	3	0.1	2
11pm - 12am	2	0.066666667	1
12am - 1am	2	0.066666667	1
1am - 2am	1	0.033333333	1
2am - 3am	1	0.033333333	1
3am - 4am	1	0.033333333	1
4am - 5am	1	0.033333333	1
5am - 6am	3	0.1	2
6am - 7am	4	0.133333333	2
7am - 8am	4	0.133333333	2
8am - 9am	5	0.166666667	3
	30		19



- The chart represents the required number of agents per hour during the night shift.
- More agents are needed around 9pm-10pm and 8am-9am, indicating higher call volumes at these hours.
- Fewer agents are required between 12am-5am suggesting lower call volumes.
- This ensures enough agents are allocated to maintain a maximum 10% abandon rate.

CONCLUSION

- This project highlighted the importance of customer experience (CX) in the success of a business, particularly in inbound customer support. By analyzing 23 days of call data, I gained insights into agent performance, customer wait times, and call outcomes. I learned how factors like queue times, call durations, and call status (answered, abandoned, or transferred) impact overall customer satisfaction.
- Additionally, this project reinforced my statistical and mathematical skills, which are essential for a data analyst. It also provided a deeper understanding of workforce planning and the strategic decisions involved in optimizing agent allocation to enhance operational efficiency. Most importantly, I now have a clearer perspective on how businesses manage customer support behind the scenes to improve service quality and efficiency.

LINK

- Excel link:

https://docs.google.com/spreadsheets/d/1xHucIP8IVUIHFW6Gb7uoWEwvhVMU6aJC/edit?usp=drive_link&oid=109524556463170667809&rtpof=true&sd=true