ABC Call Volume Trend Analysis

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PROJECT DESCRIPTION

- Objective: Explore CX analytics for inbound calling within a company's CX team using a 23-day dataset.
- Dataset Content: Agent details, call queue times, call timestamps, call durations, and call status (abandoned, answered, transferred).
- CX Team's Role: CX teams are essential in deriving insights from customer feedback and data, managing CX programs, internal communications, customer journey mapping, and data management.
- AI-Powered Tools: Leveraging AI tools (IVR, RPA, Predictive Analytics, Intelligent Routing) for enhanced CX.
- Focus Area: Examining the role of customer service representatives, particularly in inbound customer support, aiming to attract, engage, and delight customers for increased advocacy.

PROJECT OVERVIEW

The project is divided into four major objectives:

- Dataset Over view: The dataset contains 117,989 rows and 13 columns, providing detailed information about inbound calls to ABC Insurance Company.

- Average Call Duration: To Calculate the average call duration for each timebucket to gain insights into call handling efficiency .

- Call Volume Analysis: To Create a graph or chart to visually represent the number of calls received across different time buckets, enabling a clear understanding of call volume patterns.

- Manpower Planning (Day Shift): To Devise a workforce allocation plan for each time bucket during the day to reduce the abandon rate to 10%,ensuring at least 90 out of 100 calls are answered.

- Manpower Planning (Night Shift): To Propose a plan for handling the 30 nighttime calls to maintain a maximum abandon rate of 10% , enhancing the overall customer experience.

APPROACH FOR ANALYSIS

- Data Analysis Techniques: Utilized Advanced Excel formulas and statistical methods to conduct in-depth data analysis, extracting meaningful insights from the dataset.
- Assumption-Based Modeling: Incorporated relevant assumptions, such as employee working hours (excluding breaks and downtime), to facilitate accurate calculations and decision-making.
- Visualized Results: Employed charts and graphs to visually represent and communicate the project's findings, making complex data more accessible and actionable.
- Mathematical Precision: Applied rigorous mathematical techniques to ensure the accuracy of results and support informed decision-making within the project.
- Holistic Approach: Considered a comprehensive view of call center operations, including both day and night shifts, to optimize manpower allocation and enhance the customer experience.

METHODOLOGY AND TECHSTACK USED

- Tool Stack: Leveraged Microsoft Excel 2021 for data manipulation and analysis, Microsoft PowerPoint for presentation, and utilized the Data Analysis tool within Excel.
- Functional Expertise: Employed a diverse range of Excel functions and statistical tools to conduct a comprehensive analysis, extracting valuable insights from the dataset.
- Real-World Context: Incorporated real-life assumptions from IT offices and work strategies to ensure practical and relevant outcomes for decision-making.

ASSUMPTIONS

- Agent Workweek: Agents work 6 days a week.
- Unplanned Leaves: On average, each agent takes 4 unplanned leaves per month.
- Call Handling Time: On average, agents spend 60% of their actual working hours (60% of 7.5 hours) on calls with customers/users, here I have considered it 4.5 hours.
- Monthly Days: The total number of days in a month is assumed to be 30.
- IT Downtime and Meetings: Deducting time for IT errors, device downtime, and meetings, agents have an actual working duration of 4.5hours per day.

TASK-1:

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

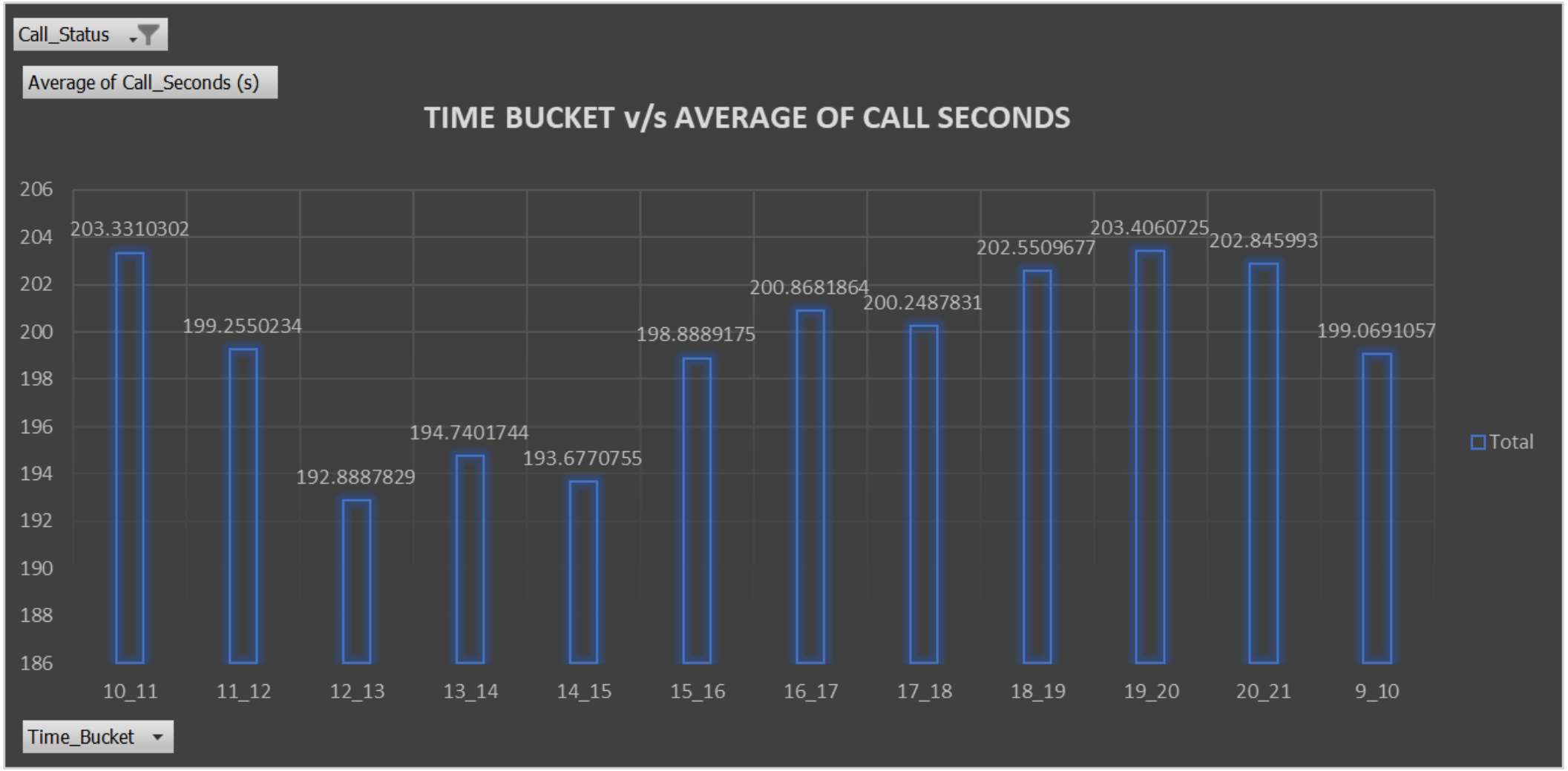
Your Task: What is the average duration of calls for each time bucket?

The graph shows the average call duration distribution in each time bucket of the Day shift.

The lowest average duration is seen on 12 to 1 PM and the highest is seen on Morning and Evening buckets.

The average duration is calculated on ANSWERED calls only.

Call_Status	answered
Row Labels	**Average of Call_Seconds (s)**
10_11	203.3310302
11_12	199.2550234
12_13	192.8887829
13_14	194.7401744
14_15	193.6770755
15_16	198.8889175
16_17	200.8681864
17_18	200.2487831
18_19	202.5509677
19_20	203.4060725
20_21	202.845993
9_10	199.0691057
Grand Total	**198.6227745**

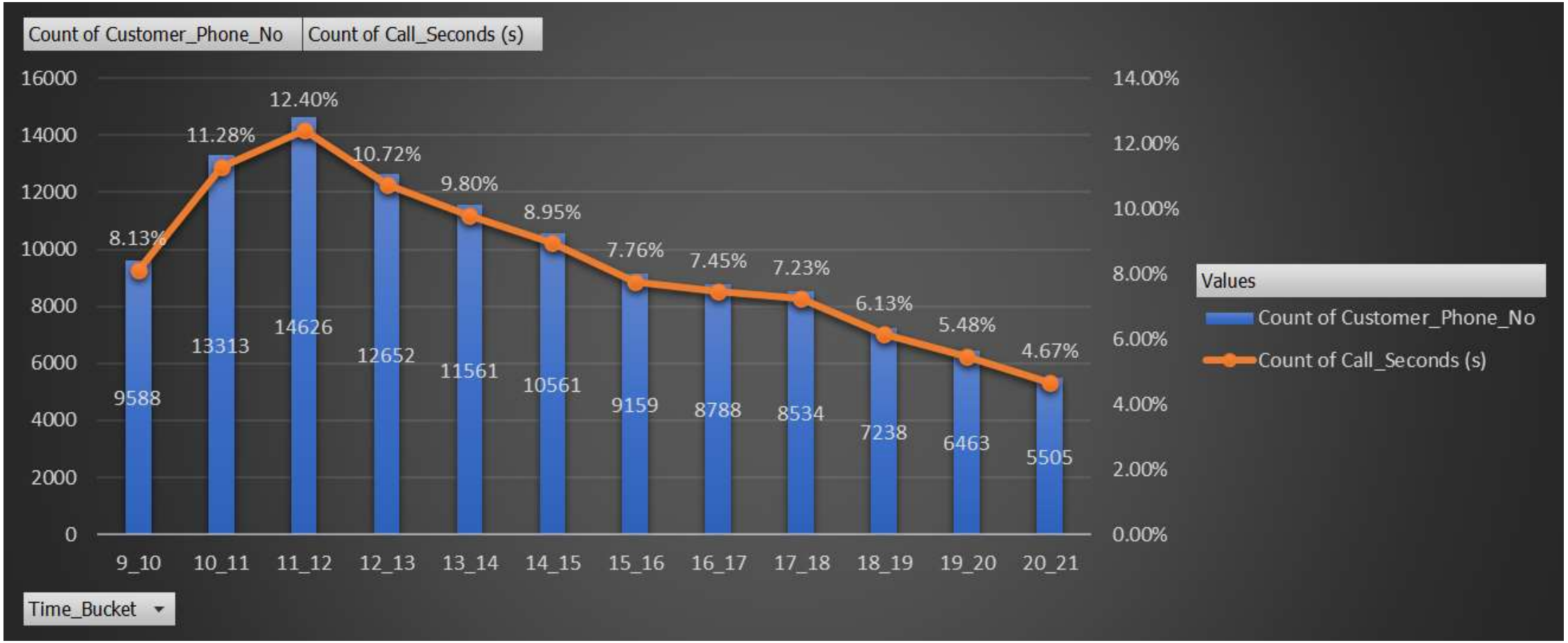


From the graph, we can conclude that most calls are received at the night time in between 7pm-8pm and least calls are made in the afternoon in between 12pm-1pm.

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?

- The graph shows the counts of received calls and their ratio in each time bucket.
- The counts of the customer phone numbers were set to the secondary axis and the count of received calls were set to the primary axis.
- There is a sharp decrease in count of received calls from 12Pm afterwards.

Row Labels	Count of Customer_Phone_No	Count of Call_Seconds (s)
9_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%**



From the graph, we can conclude that most calls are received at the morning time in between 11am-12pm and least calls are made in the night in between 8pm-9pm.

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%?

PROCEDURE:

- First, we created pivot table. Date & Time is dragged down to Rows, Call Status to Columns,while taking count Call Duration in the Values section.
- Then, we calculated the average of abandon, answered and transfer by using the average excel formula.
- 29% of the calls are abandoned, 1% is transferred, while 70% of the calls are answered in the day time.
- Total agents required to answer the 90% of the calls per day is 57.
- The minimum number of agents required for each time bucket is calculated by 57 * count of time (calculated in the 2nd question).

Row Labels	Count of Call_Seconds (s)	Count of Call_Seconds (s)2	Time Distribution	Agents Required
9_10	8.13%	9588	0.08	5
10_11	11.28%	13313	0.11	6
11_12	12.40%	14626	0.12	7
12_13	10.72%	12652	0.11	6
13_14	9.80%	11561	0.10	6
14_15	8.95%	10561	0.09	5
15_16	7.76%	9159	0.08	4
16_17	7.45%	8788	0.07	4
17_18	7.23%	8534	0.07	4
18_19	6.13%	7238	0.06	3
19_20	5.48%	6463	0.05	3
20_21	4.67%	5505	0.05	3
Grand Total	100.00%	117988	1.00	57

working hours per agent	4.5
average call duration	198.62
for 90% hours needed	254.7258322
number of needed is to convert answering call from 70% to 90%	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. 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

PROCEDURE:

- We first calculated the Time Distribution by dividing each calls distribution by total calls i.e. 30.
- The number of agents required for each time bucket is calculated by 17 * Time Distribution.
- Note: 17 is calculated above by dividing the additional hours required to answer the night calls by 4.5 (actual working hours of agents).

AVERAGE INCOMING CALLS	5130
AVERAGE INCOMING CALLS AT NIGHT for every 100 calls that customers make between 9 am and 9 pm the customer also make 30 calls at night between 9 pm and 9 am	1539
Average seconds required to anwer the call	305676.2
Average hours to answer the call	84.91005
Actual average hours required to answer the calls	76.41905
Agents required to answer the call	17

Time Bucket	calls made	time distribution	No of Agents
9pm-10pm	3	0.10	2
10pm-11pm	3	0.10	2
11pm-12am	2	0.07	1
12am-1am	2	0.07	1
1am-2am	1	0.03	1
2am-3am	1	0.03	1
3am-4am	1	0.03	1
4am-5am	1	0.03	1
5am-6am	3	0.10	2
6am-7am	4	0.13	2
7am-8am	4	0.13	2
8am-9am	5	0.17	3
Total	**30**	**1.00**	**17**

INSIGHTS

- The customers call the least in the evening. So, the company can reduce the number of agents at that time for answering the calls.
- The company can hire 17 customer support agents for the night shift work.
- The company can shift some of the day workers for the night shift.
- The employees who are working 9 am to 9 pm. The manager can change some of the workers shift from 5 am to 2 pm and some workers from 2 pm to 11 pm to get the most calls answered.
- The company can make the employers divide into 3 parts too, so that the agents are always available 24/7.
- We found there were few outliers in the data. And if we have removed that outliers, then the answers would have been different.

RESULTS

- I learned how an analyst can make an impact in customer service department.
- I learned how a company deals with the customers to give them the most satisfaction.
- I got to know about the IVR Duration, which is an AI tool, who answer the calls to get to know the customer exact question and then transfer it to the right agent to get the customer's queries get answered.
- This project was easy to get the answers as the data provided by the team have already calculated the time bucket and converted the calls duration into seconds, so we do not had to spend time on it to calculate.
- I learned about the behavioural analytics.

PROJECT LINK:
https://docs.google.com/spreadsheets/d/1b2R8crt9Zq7R7RWCJ2EJdP4Rdspb1xrx/edit?usp=drive_link&ouid=107111635379336937367&rtpof=true&sd=true
PROJECT PDF LINK:
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