ABC Call Volume Trend Analysis

By

Stan Pereira

Project Description

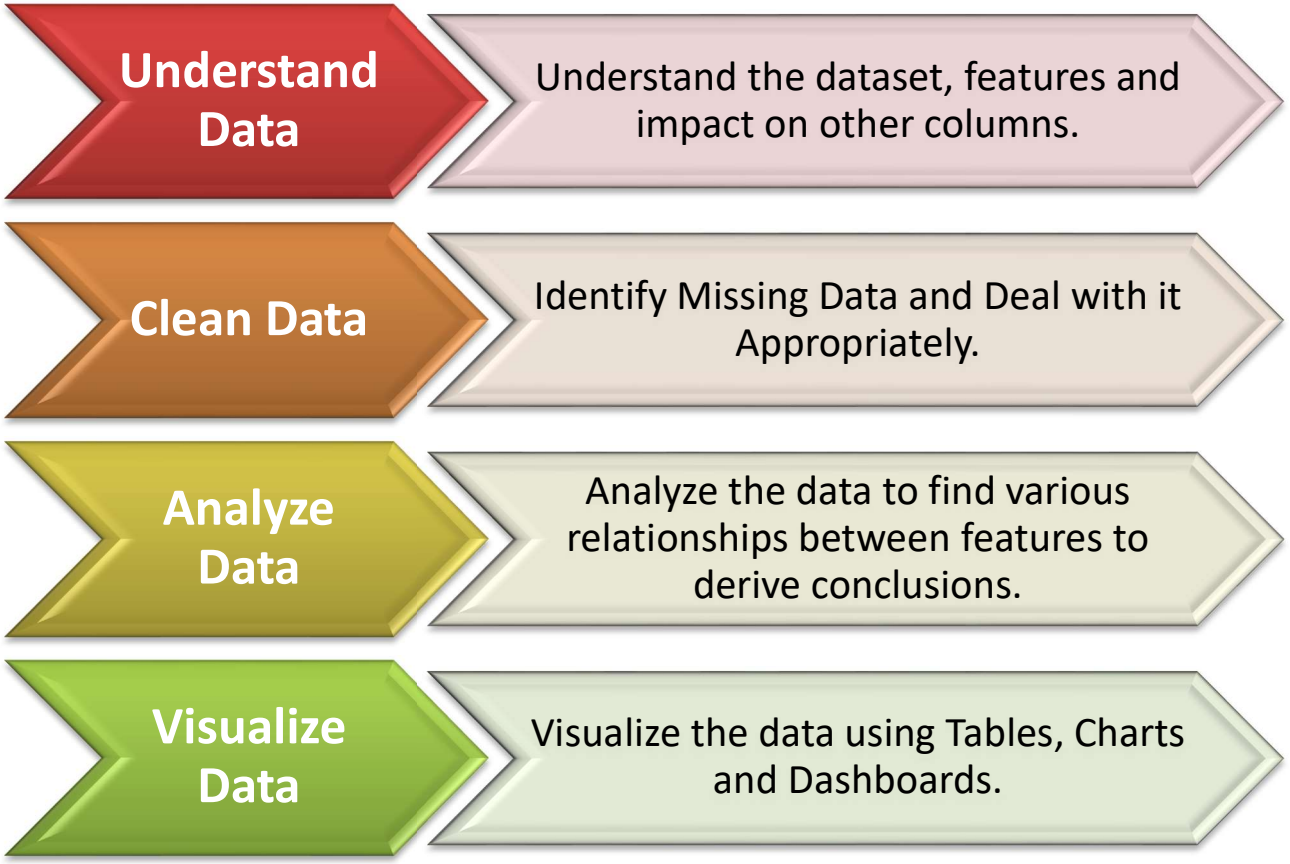
A Customer Experience (CX) team plays a crucial role in a company. They analyze customer feedback and data, derive insights from it, and share these insights with the rest of the organization. This team is responsible for a wide range of tasks, including managing customer experience programs, handling internal communications, mapping customer journeys, and managing customer data, among others.

One of the key roles in a CX team is that of the customer service representative or call center agent. These agents handle various types of support, including email, inbound, outbound, and social media support.

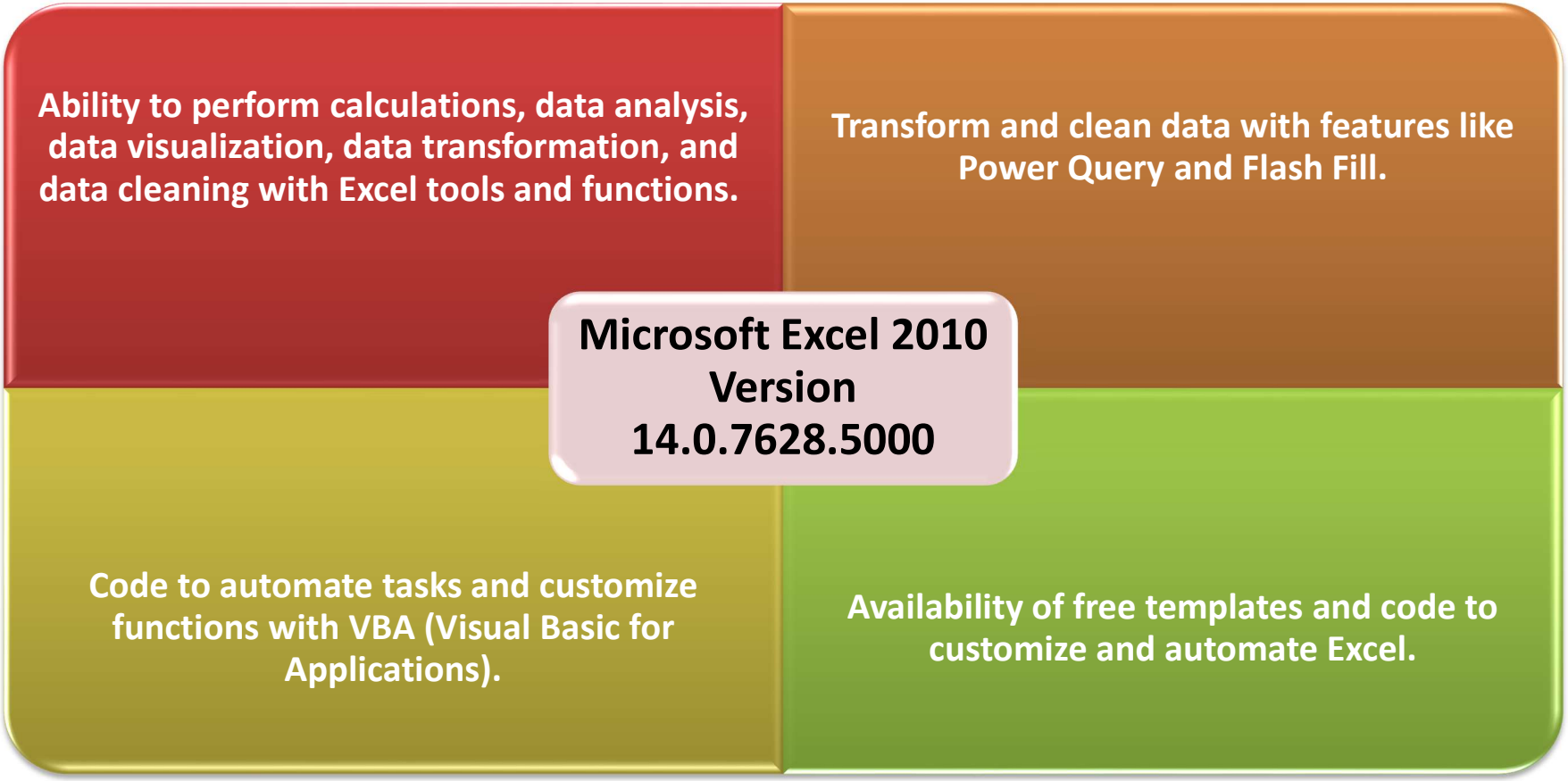
The dataset provided spans 23 days and includes various details such as the agent's name and ID, the queue time, the time and duration of the call and the call status.

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.

Approach


Understand Data
Understand the dataset, features and impact on other columns.
Clean Data
Identify Missing Data and Deal with it Appropriately.
Analyze Data
Analyze the data to find various relationships between features to derive conclusions.
Visualize Data
Visualize the data using Tables, Charts and Dashboards.

Tech Stack Used



Understand Data

Table Information (Original)	
Total Rows	117988
Total Columns	13
Total Blanks	47877
Duplicates	0

Columns	Blank Count
Agent_Name	0
Agent_ID	0
Customer_Phone_No	0
Queue_Time(Secs)	0
Date_&_Time	0
Time	0
Time_Bucket	0
Duration(hh:mm:ss)	0
Call_Seconds (s)	0
Call_Status	0
Wrapped _By	47877
Ringing	0
IVR _Duration	0

Clean Data

Table Information (Clean)	
Total Rows	117988
Total Columns	13
Total Blanks	0
Duplicates	0

Blank/Null Value Update

Wrapped By	Call Status	Count	New Value
Blank	Abandon	34403	Not Available
Blank	Answered	13362	Agent
Blank	Transfer	112	Agent

Value Changes

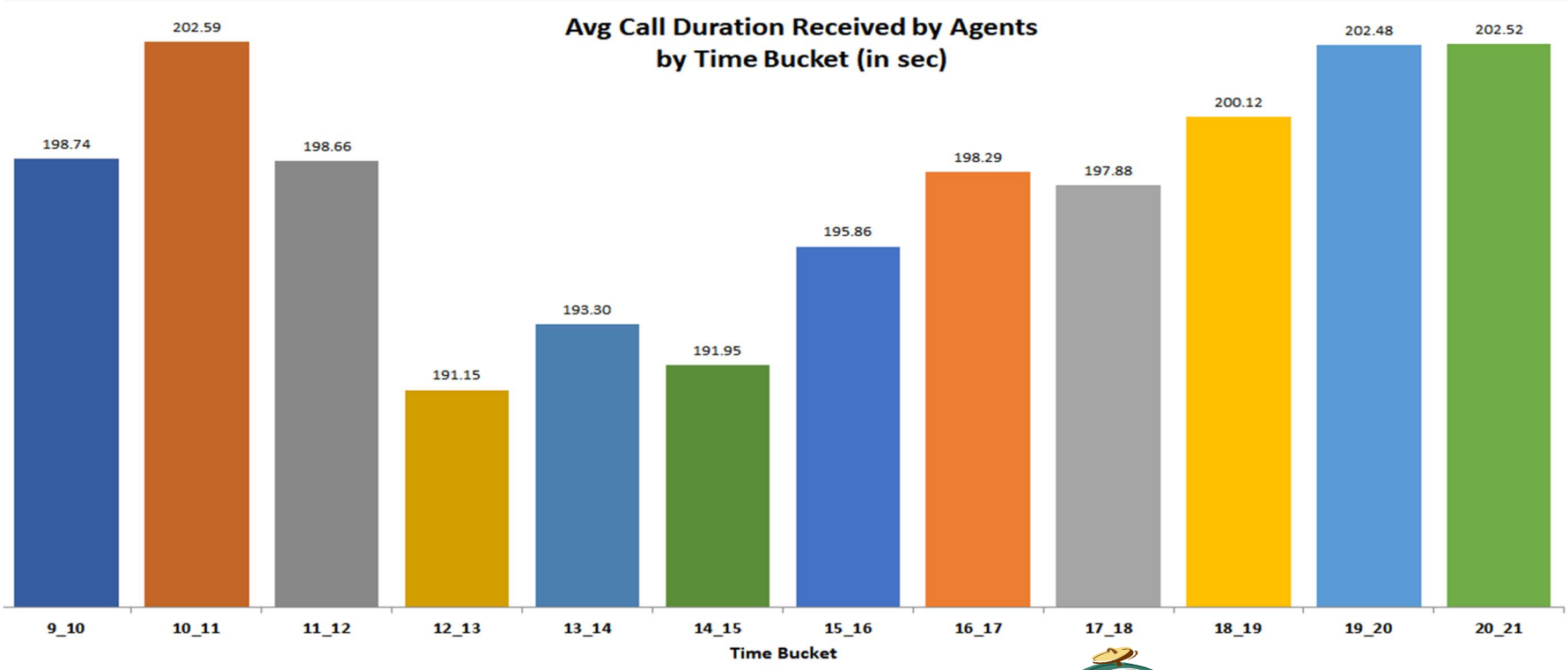
Column Name	Old Value	New Value
Customer Phone No.	XXXXX	XXXXXXXXXX
Customer Phone No.	CzentXXXXX	No Change as this could be a Special Number made using the alphabets associated with the numbers on a dialpad (CZENT = 29368)

Column Name	Format Change
Agent_Name	Converted to Text
Agent_ID	Converted to Text
Customer_Phone_No	Converted to Text
Queue_Time(Secs)	Converted to Number without Decimal
Date_&_Time	Converted to "dd-mmm-yyyy hh:mm:ss" Format
Time	Converted to Number without Decimal
Time_Bucket	Converted to Text
Duration(hh:mm:ss)	No Format Change
Call_Seconds (s)	Converted to Number without Decimal
Call_Status	Converted to Text
Wrapped _By	Converted to Text
Ringing	Converted to Text
IVR _Duration	No Format Change


Analyze & Visualize
Data

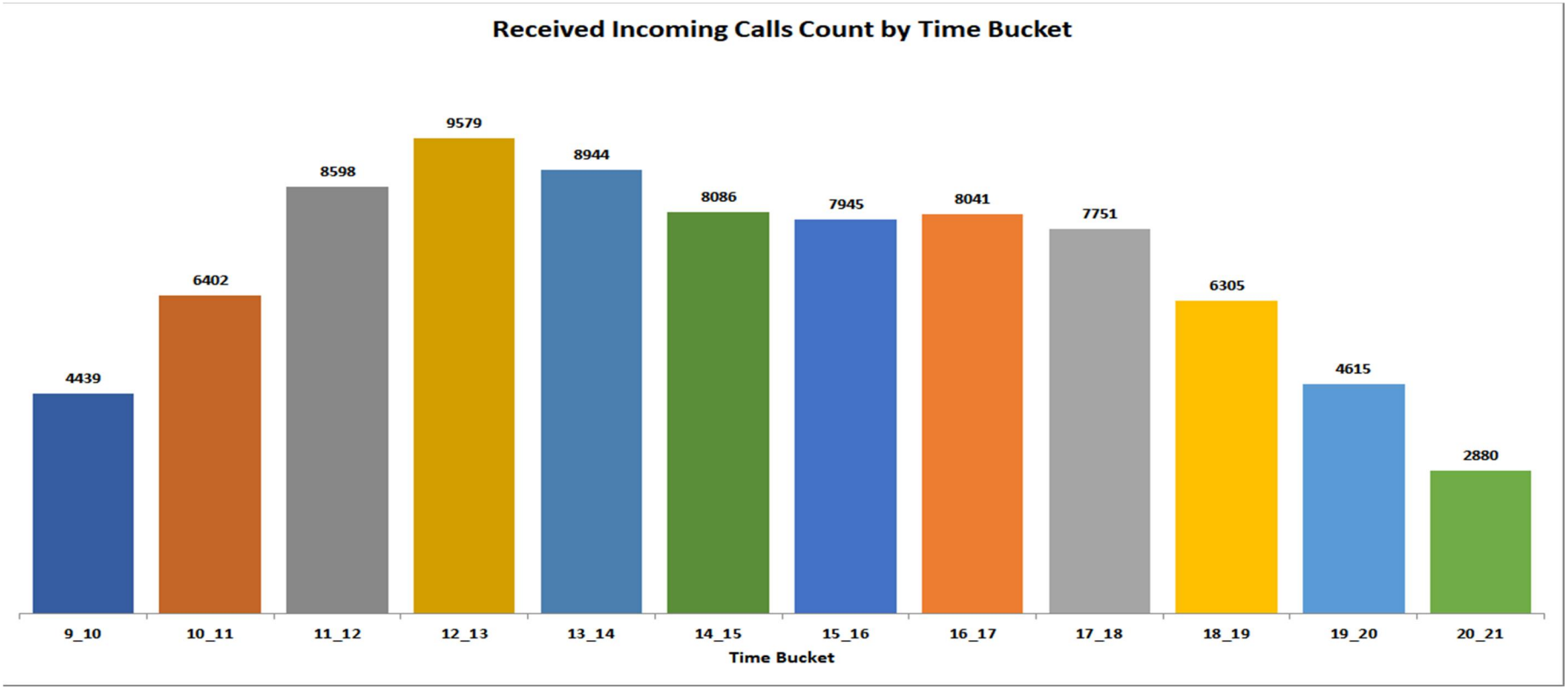
Average Call Duration: Determine the average duration of all incoming calls received by agents. This should be calculated for each time bucket.

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



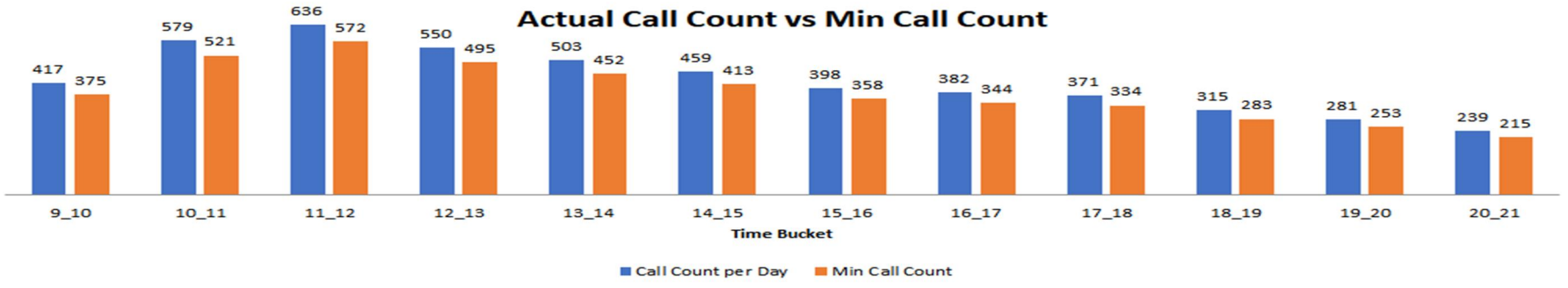
Avg. Call Duration : 196.96 sec

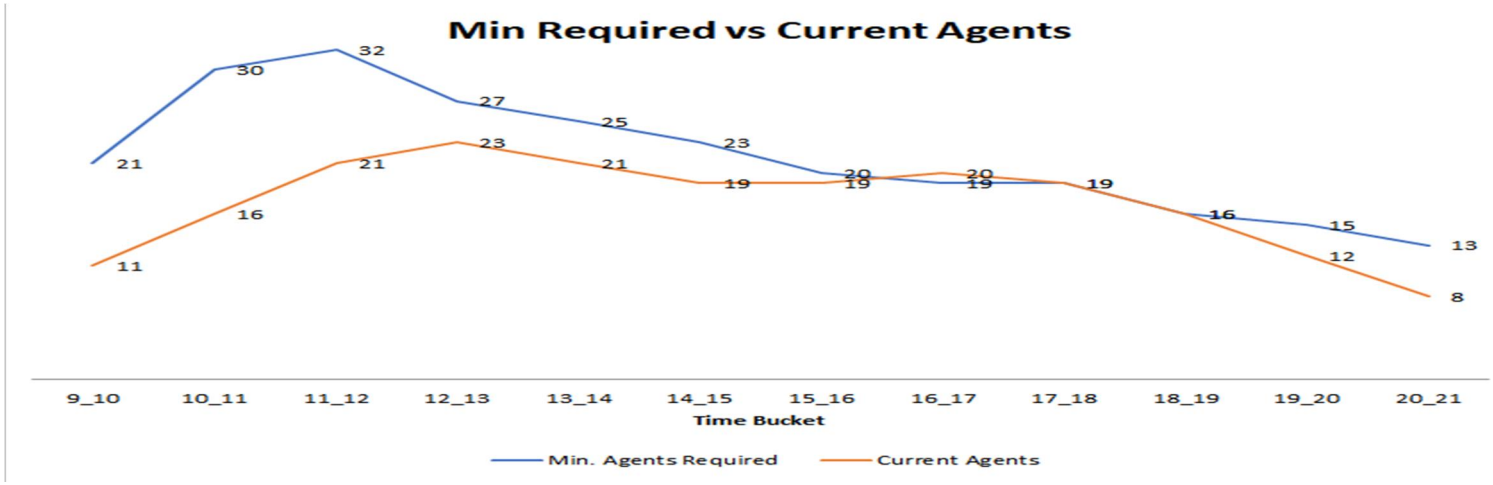
Call Volume Analysis: Visualize the total number of calls received. This should be represented as a graph or chart showing the number of calls against time. Time should be represented in buckets (e.g., 1-2, 2-3, etc.).
Your Task: Can you create a chart or graph that shows the number of calls received in each time bucket?



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%.

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





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 and Calculations	
Total Days	30 days
Working Days in week	6 days
Unplanned Leaves per month	4 days
Working Hours in day	9
Lunch and Breaks (in hrs)	1.5
Actual Working Hours (AWH)	7.5
Occupancy %age of AWH	60%
Occupancy (in hrs)	4.50
Non-Occupancy (in hrs)	4.50
Non-Occupancy %age	50%
Waiting Probability	100%
Abandon Rate	10%
Shrinkage (4 days Unplanned & 4 Days Weekly Off)	26.67%
Average Call Duration for 2100 to 0900 hrs is an assumption based on actual data	

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Time Bucket	Average Call Duration	Call Distribution	Call Count per Day	Abandon Rate	Min Call Count	Max Calls that can be received	Min. Agents Required	Non-Occupancy %age (60% of 7.5 hrs + 1.5 hrs Breaks)	Agents required after taking into account of occupancy	Shrinkage (8 days in a month - 4 unplanned and 4 w/off)	Agents Required per time bucket
9_10	198.74		417	10%	375	18	21	50%	42	26.67%	58
10_11	202.59		579	10%	521	18	30	50%	60	26.67%	82
11_12	198.66		636	10%	572	18	32	50%	64	26.67%	88
12_13	191.15		550	10%	495	19	27	50%	54	26.67%	74
13_14	193.30		503	10%	452	19	25	50%	50	26.67%	69
14_15	191.95		459	10%	413	19	23	50%	46	26.67%	63
15_16	195.86		398	10%	358	18	20	50%	40	26.67%	55
16_17	198.29		382	10%	344	18	19	50%	38	26.67%	52
17_18	197.88		371	10%	334	18	19	50%	38	26.67%	52
18_19	200.12		315	10%	283	18	16	50%	32	26.67%	44
19_20	202.48		281	10%	253	18	15	50%	30	26.67%	41
20_21	202.52		239	10%	215	18	13	50%	26	26.67%	36
21_22	196.96	3	154	10%	139	18	8	50%	16	26.67%	22
22_23	196.96	3	154	10%	139	18	8	50%	16	26.67%	22
23_00	196.96	2	103	10%	92	18	6	50%	12	26.67%	17
00_01	196.96	2	103	10%	92	18	6	50%	12	26.67%	17
01_02	196.96	1	51	10%	46	18	3	50%	6	26.67%	9
02_03	196.96	1	51	10%	46	18	3	50%	6	26.67%	9
03_04	196.96	1	51	10%	46	18	3	50%	6	26.67%	9
04_05	196.96	1	51	10%	46	18	3	50%	6	26.67%	9
05_06	196.96	3	154	10%	139	18	8	50%	16	26.67%	22
06_07	196.96	4	205	10%	185	18	11	50%	22	26.67%	30
07_08	196.96	4	205	10%	185	18	11	50%	22	26.67%	30
08_09	196.96	5	256	10%	231	18	13	50%	26	26.67%	36

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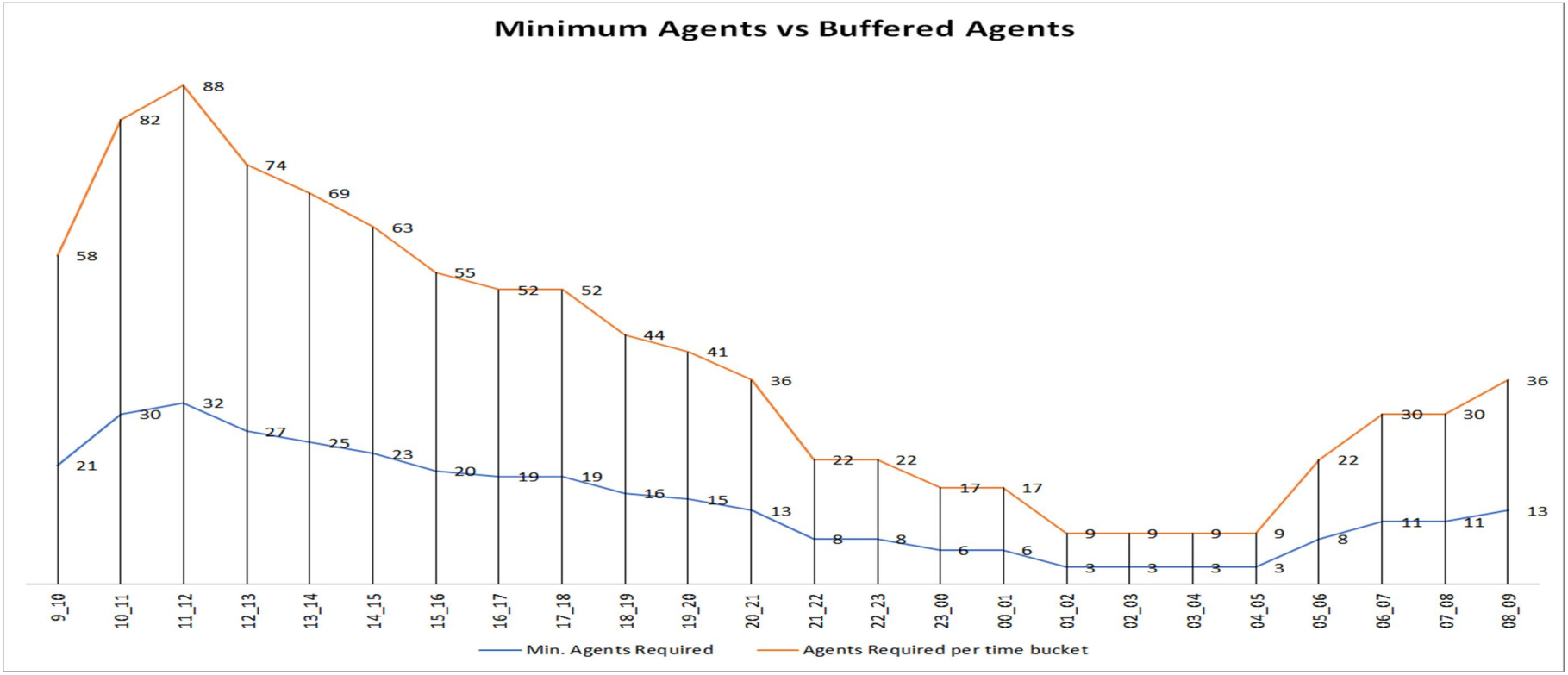

Summary

This project involved research on Time Series and Manpower Planning at Call Centres.
Most of the analysis was done by using Pivot Tables and Formulas.

In Statistics, a lot of research was done on how a Call Centre Manpower Planning is done. New concepts like Erlang Formula was researched and understood. This helped understand better how to solve the problem.

Overall, though the project started out easy and familiar, the major challenge was the Manpower planning which required a lot of research and learning.

Link to Excel File

Call Volume Trend Analysis (Excel File)

THANK YOU