Optimizing Bank Marketing Campaigns:

Insights from Data Visualization

Table of contents

I. INTRODUCTION

As a junior business analyst, my primary goal in this project is to gather significant insights from the numerous of customer information and bank history provided in the dataset.

This small project includes objectives such as studying age distribution discrepancies, assessing the impact of a client's employment on their probability to deposit, and investigating the relationship between contact time and campaign effectiveness. These insights will be critical in helping the bank establish successful campaign engagements.

The final step of this research will be to develop a perfect marketing plan for the upcoming years, leveraging the knowledge gathered to drive effective and informed decisions.

Data Overview

Number of Bank Clients	Total Clients' Balance	Total Number of Contacts Performed	Avg. Customer Age
11,162	17,061,547	27,999	41

The dataset combines information from 11,162 bank clients, collectively holding a total bank balance exceeding 17 million units of currency. Additionally, during the previous campaign, the bank initiated approximately 27,999 customer contacts, utilizing various communication channels such as cellular, telephone, and other methods to engage with clients.

II. CASE STUDY VISUALISATIONS

2.1. Age distribution between clients who choose to make a deposit and those who do not.

Chart Construction Logic

In this part, I use a bar chart to compare age distribution between customers who made a deposit and those who did not. Age categories are created for clearer visualization, with ages on the x-axis and deposit status on the y-axis. The chart shows the number of clients in each age category who made deposits, using distinct colors to differentiate between depositors and non-depositors. This visualization effectively highlights age-related trends in deposit behaviour.

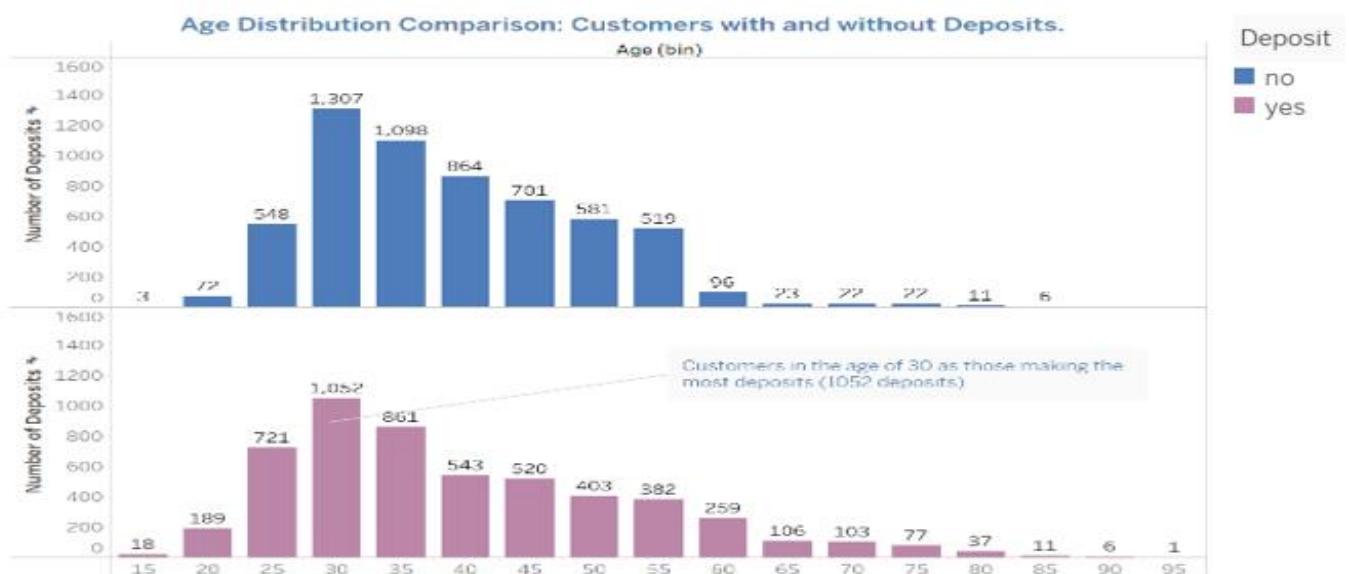Age Distribution Comparison: Customers with and without Deposits.

Chart Findings and Interpretations

The bar chart offers a compelling insight into the relationship between customer age and deposit habits. In particular, the 30-year-old age group is the most active depositors, with a significant spike of 1,052 customers who have deposited money. With 721 and 861 depositors, respectively, age groups 25 and 35 show significant interest in deposits, indicating their stronger reactivity to deposit-related marketing. However, beyond age 35, there is a noticeable decline in both deposits and non-deposits, indicating decreased interest among older customers.

2.2. Visualisation of Occupational Influence on Deposit Behaviour Analysis

Chart Construction Logic

The next visualisation will demonstrate how a client's job impacts their decision to make a deposit. We've used a stacked bar chart, which makes it easy to compare deposit behaviours based on different job categories.

The horizontal axis represents various job classifications, helping us categorize the bank's diverse customer base by their professions. The vertical axis shows the 'Number of Deposits,' revealing how many customers in each job category chose to make a deposit and how many did not. To provide precise information, I have included exactly number of deposits in each job category to see the exact count of customers in each job type who made deposits. The colour coding further distinguishes depositors (in purple) from non-depositors (in blue), making it easy to differentiate between the two groups, following Bertin's principles of effective use of colour for clarity.

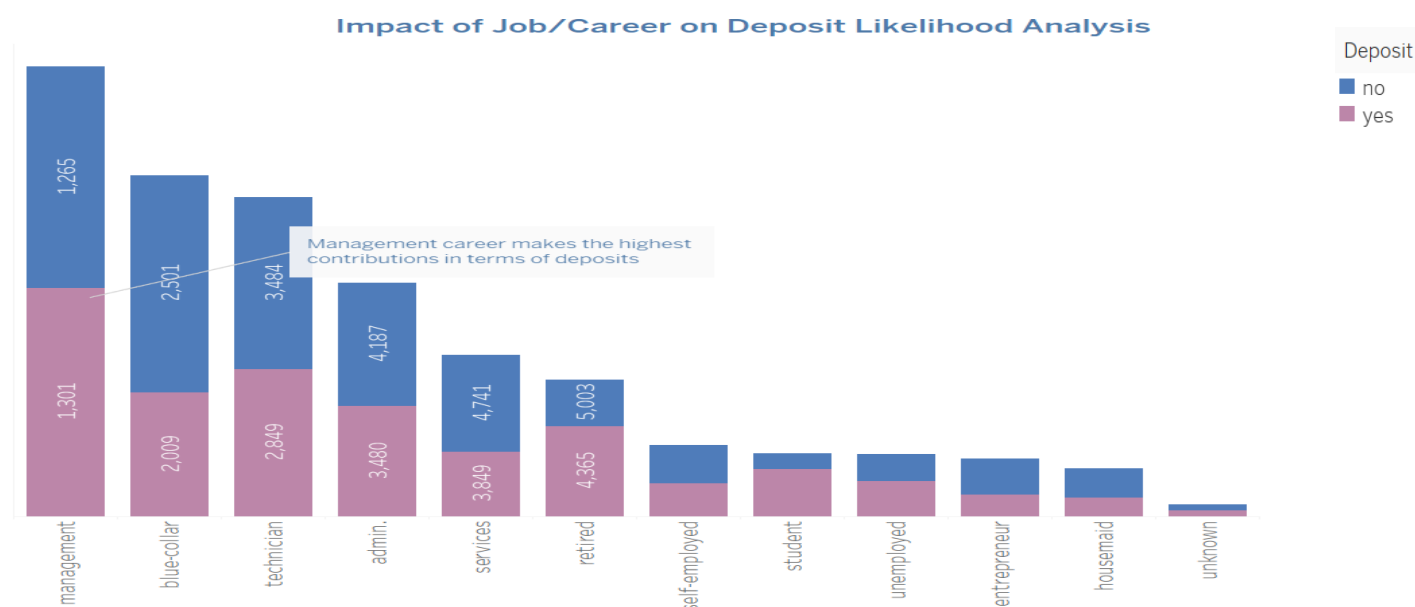Impact of Job/Career on Deposit Likelihood Analysis

Chart Findings and Interpretations

The stacked bar chart provides a clear picture of the influence of various employment types on deposit probability. Notably, some occupations, such as management, blue-collar, technician, administrator, and retirees, have a larger procedure to make deposits. Management stands out with 1301 deposits and 1265 non-deposits, demonstrating a balanced presence. With 2009 deposits and 2501 non-deposits, blue-collar employees exhibit significant deposit activity. Likewise, technicians, administrative personnel, and retirees all demonstrate significant deposit behaviours.

On the other hand, self-employed, students, the jobless, entrepreneurs, and housemaids, have significantly lower involvement in deposits, filling a smaller piece of the chart. This implies that they are less likely to make term deposits. As a result, focusing marketing techniques to more deposit-active job types, such as management and blue-collar employees, may produce better results. However, it is critical to understand that smaller occupational groupings may have to use different message or engagement strategies in order to increase their deposit possibility.

2.3. Investigating the Influence of Last Contact Duration on Campaign Success

Chart Construction Logic

The box plot chart has been used effectively to explore the critical issue of how the duration of the last contact affects the campaign's success. The box plot presents two unique box plots side by side, one for clients who make deposits ('Yes' category) and the other for clients who have not make deposits ('No' category). These box plots are useful for analysing the average of the last contact length for both groups, offering information on potential differences and trends in campaign success.

The variable shown along the vertical axis is duration, which is measured in seconds and provides a clear depiction of the time spent during the last contact. More importantly, the 'Deposit' variable is encoded in colour by colours option in mark box to clearly visualize the difference between customers who have and have not deposited money. The use of colour guarantees that viewers may easily distinguish the deposit behaviours of the two groups.
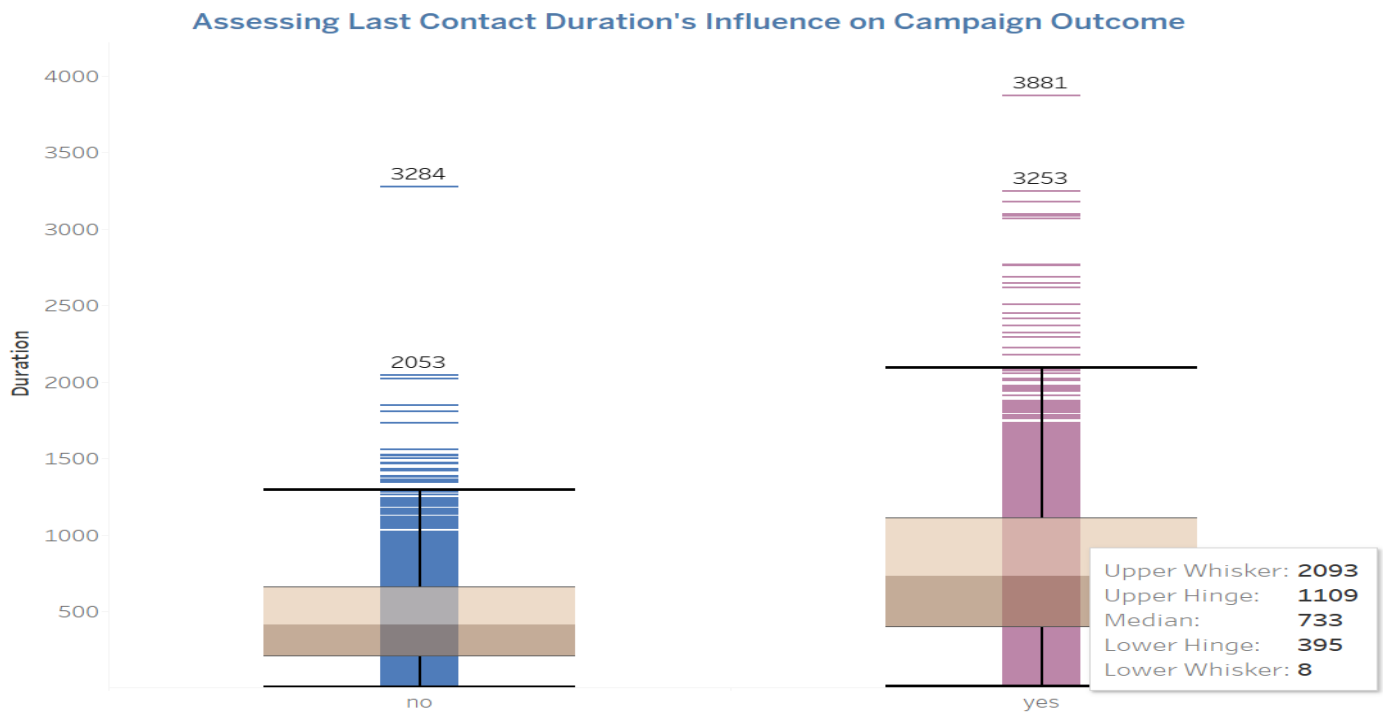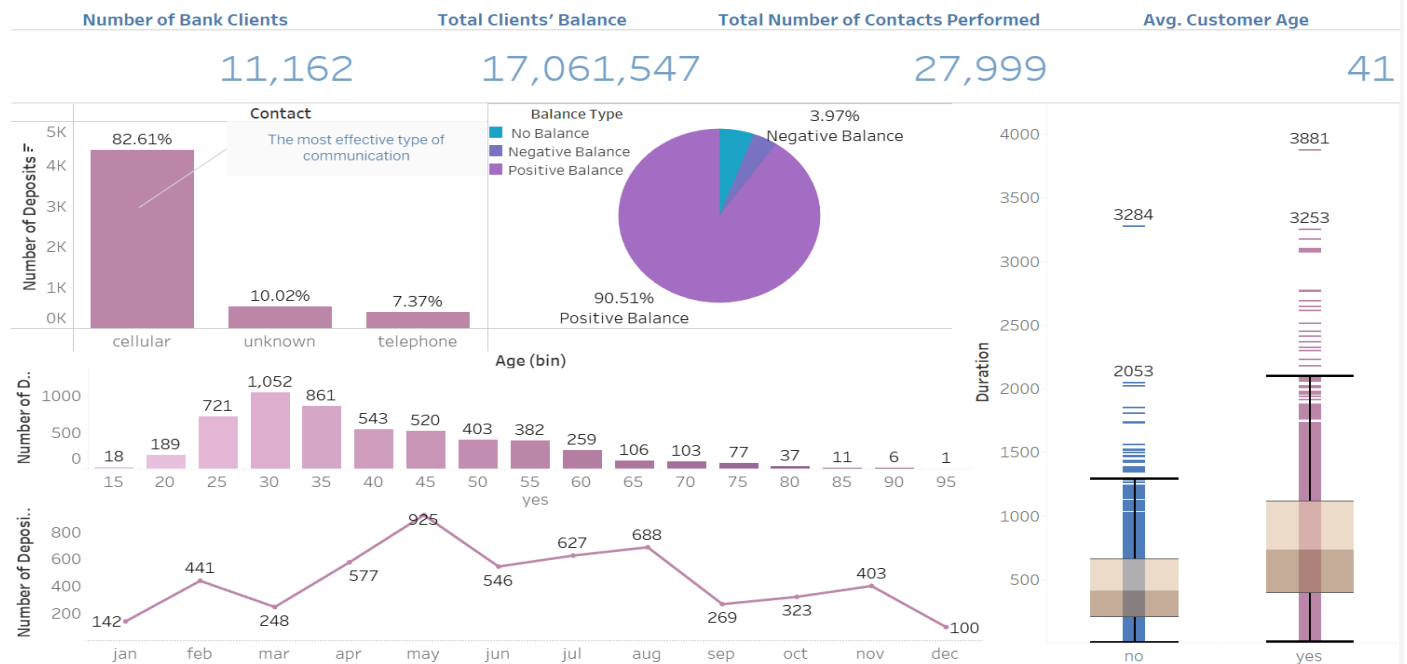

Chart Findings and Interpretations

The box plot that investigates the impact of last contact length on campaign success reveals fascinating outcomes. It displays the contact length distribution for consumers who made deposits ("yes") and those who did not ("no"). The median contact length among consumers who made deposits is 531 seconds, with an interquartile range (IQR) ranging from 294 to 840 seconds. This implies that customers who made deposits had longer interaction lengths on average during the campaign. Conversely, customers who did not make deposits had lower interaction lengths, with a median of 265 seconds and an IQR ranging from 135 to 419 seconds.

2.4. Designing a Targeted Marketing Plan

BANK MARKETING STRATEGIES ANALYTICS DASHBOARD

Number of Bank Clients	Total Clients' Balance	Total Number of Contacts Performed	Avg. Customer Age
11,162	17,061,547	27,999	41

The success of our marketing campaign hinges on our ability to translate valuable insights from data visualization into actionable strategies. In this comprehensive marketing plan, we will utilize the "Bank Marketing Strategies Analytics Dashboard" to leverage insights from four pivotal variables uncovered through data visualization:

Customer Segmentation

Age Distribution of Customers with Deposits.
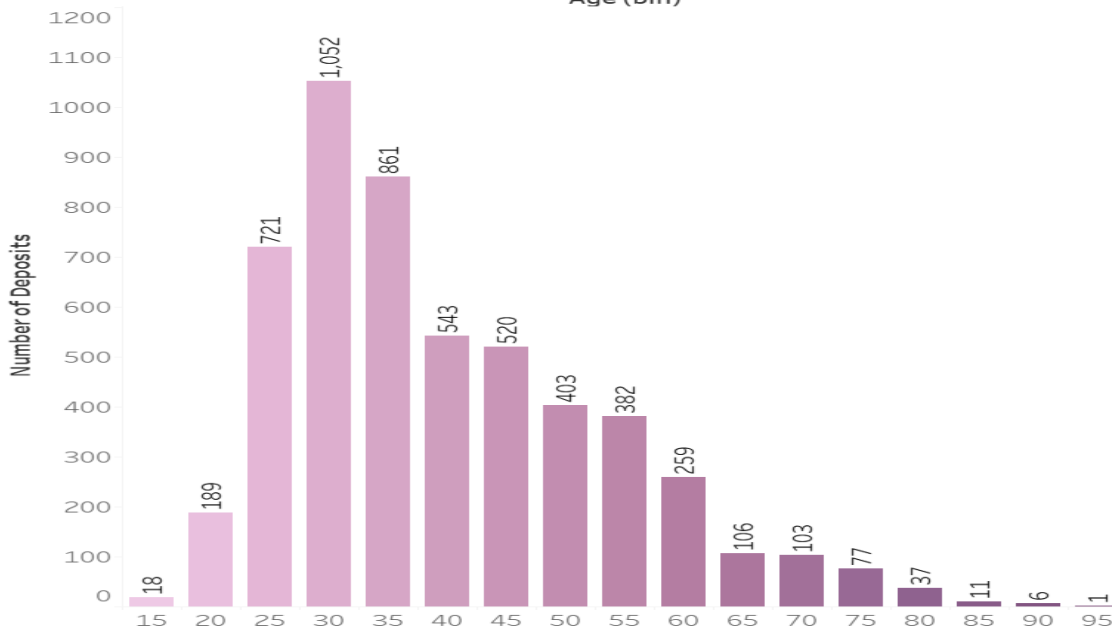
Combining with the first visualisation "Age Distribution comparison: Customer with and without Deposits", The chart clearly reveals that customers between the ages of 25 and 45 are more likely to make deposits, with a significant peak at age 30, indicating a large number of customers in this age group who have deposited money.

This analysis emphasizes the importance of focusing our marketing campaign on the 25 to 45 age group. They are more likely to respond positively to our campaign messages. By tailoring our strategy to this age group, we can increase our chances of encouraging customers to open term deposits while optimizing our marketing budget allocation for each age category.

Distribution Channels

The Influence of Communication Types on Customer Deposit Behavior
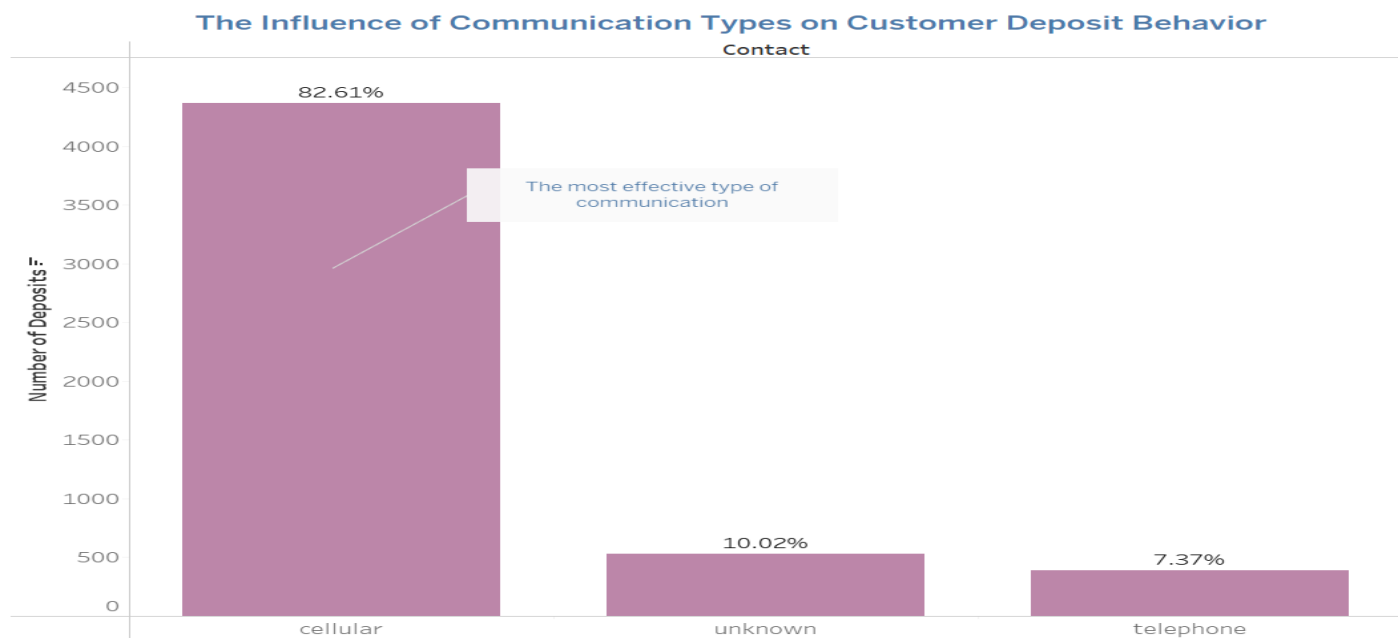
The bar chart illustrating the efficiency of various communication channels in reaching clients provides crucial marketing data. Among the channels, "cellular" is the most effective, catching the attention of 82.61% of clients who made deposits. In comparison, "telephone" was far less effective, with just 7.37% of deposit-making consumers contacted through this route, while other channels accounted for 10.02%.

This suggests that focusing on "cellular" communication channels is the most promising strategy for effectively disseminating campaign messages to encourage deposit behaviour. Given the high rate of consumer reaction to "cellular" communication, spending a sizable part of resources to this channel is justifiable. However, further research is needed to explore additional channels that might enhance the diversity of communication options with various customer segments.

Leveraging Balance Categories for Marketing Success.

**Balance Categories and Their Impact on Deposit Behavior**
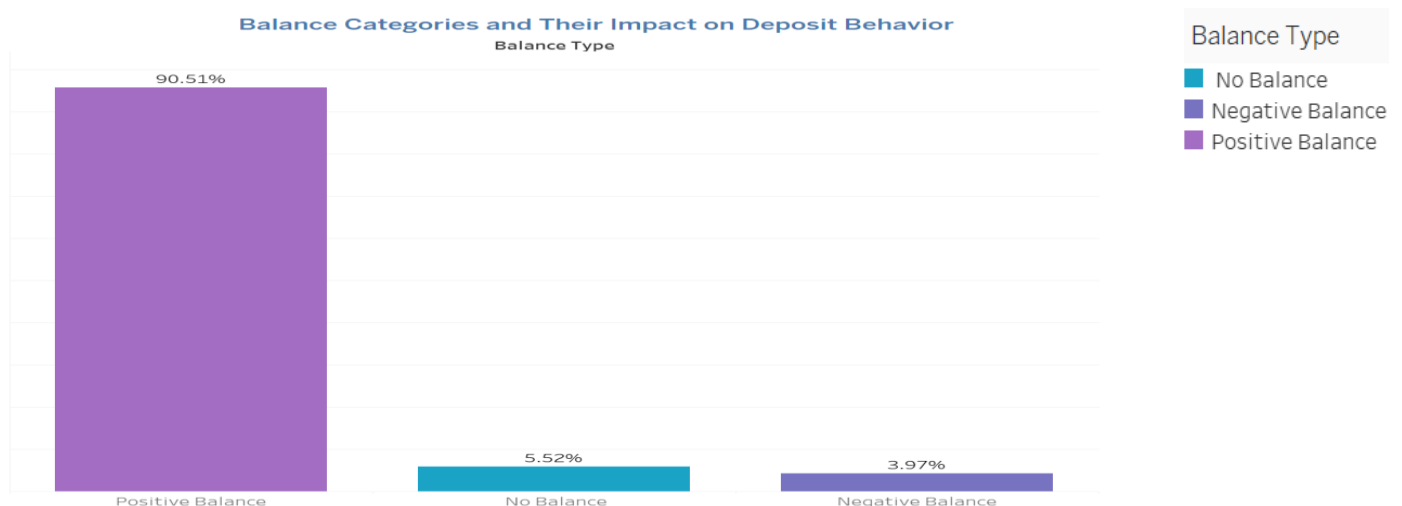
This bar chart depicting customer distribution across balance categories and deposit activity offers an understanding of the influence of balance on deposit behaviours. Particularly, a large majority of consumers, 90.51% of deposit-making customers, fall into the "positive balance" group. This implies that consumers with a positive balance are more likely to make a deposit.

In contrast, a tiny percentage of clients, around 3.97%, fall into the "negative balance" group. Despite this, it's important to point out that some of these clients elected to make deposits. While this is a minority, it signifies the

importance of considering customers' specific financial circumstances and their willingness to engage with deposit accounts, even in the face of negative balances.

To enhance the success of the marketing effort, target the "positive balance" category, since this group has a high proclivity to make deposits.

Promotional Strategy and Lessons from Past Campaigns.

Impact of Last Contact Month on Term Deposit Subscriptions
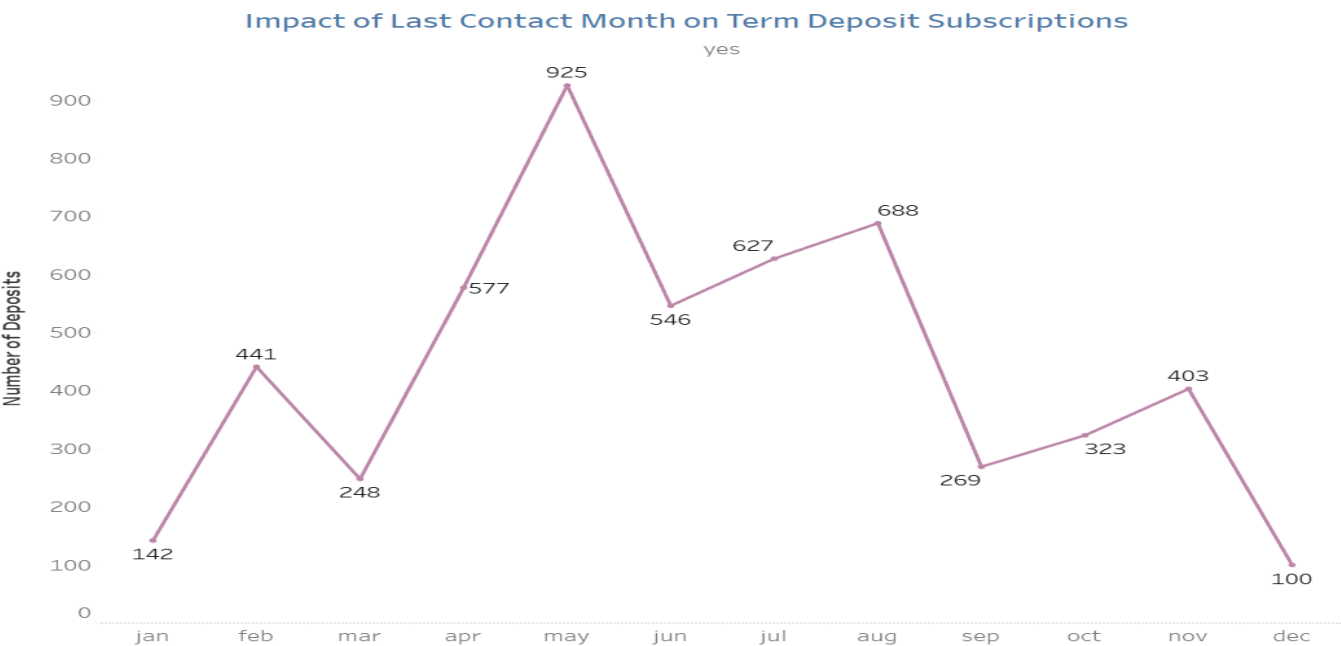
According to the chart, the highest number of deposits occurred in May, with a total of 925 deposits. This suggests that May was a highly successful month for attracting customer deposits. Besides it, other months with significant deposit numbers include March (557 deposits), July (688 deposits), and August (627 deposits). In contrast, December had the lowest number of deposits, with just 100 deposits. This indicates that the end of the year might not be the most effective period for deposit-related marketing campaigns.

These findings indicate the importance of timing in your marketing campaign. The higher deposit numbers may be associated with certain months, which can be indicative of more effective campaign periods or external factors influencing customer behaviours. Additionally, identifying months with lower deposit numbers can help pinpoint areas for improvement in your marketing strategy, such as adjusting campaign timing or content to align with customer preferences and behaviours.

Moreover, I also analyse the last contact durations in the last campaign to demonstrate the effective marketing strategy.

Assessing Last Contact Duration's Influence on Campaign Outcome
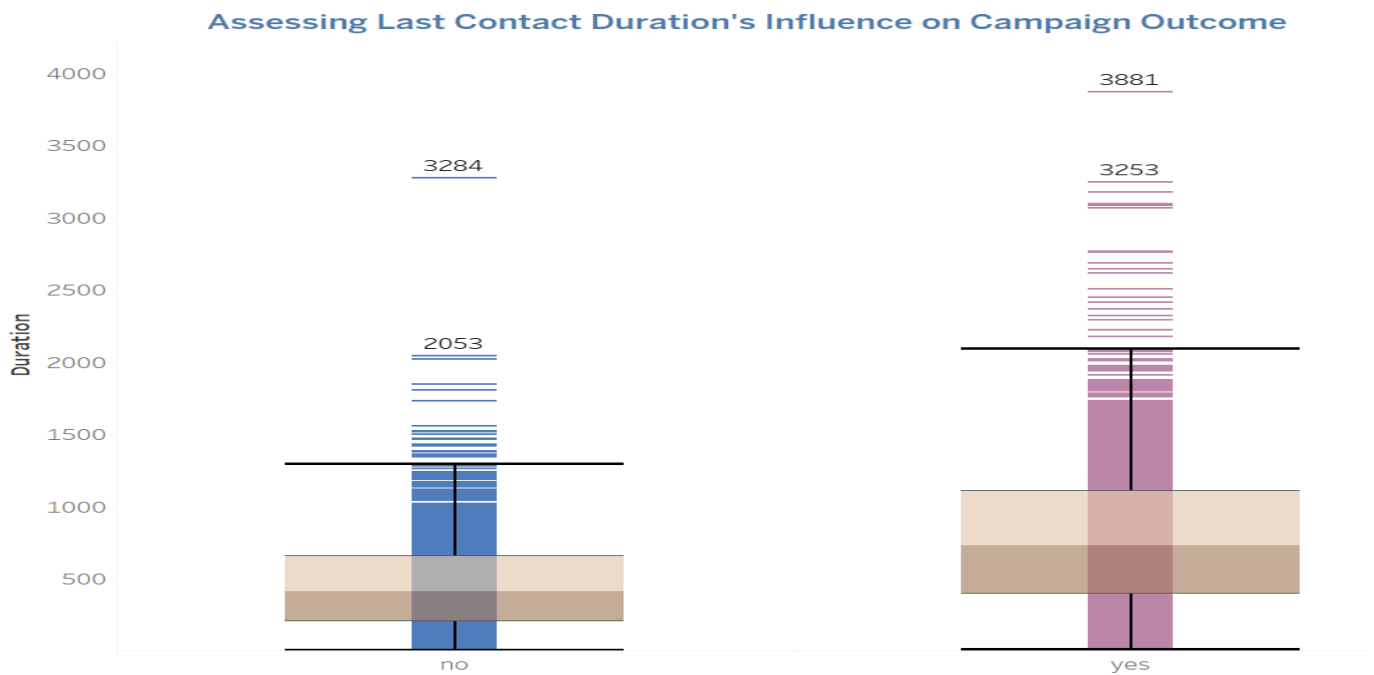
The box plot comparing the durations of last contact for consumers who made deposits with those who did not gives useful information for our marketing strategy. Customers who made deposits had longer interactions, with a median of 531 seconds, whereas customers who did not make deposits had shorter interactions, with a median of 265 seconds. This implies that more lengthy contacts have had a beneficial effect on deposit behaviours, guiding us to focus on engaging clients for greater periods of time to improve campaign performance.

III. CONCLUSION

Our data-driven analysis unveils critical insights for a thriving marketing campaign aimed at attracting term deposit customers. Here are the significant points need to be focused on:

- o Customer Segmentation: The 25-45 age group, particularly around age 30, emerges as the most receptive segment.
- o Distribution Channels: Elevate "cellular" channels, while keeping the door open for diversification in future campaigns.
- o Balance Categories: Direct your focus towards customers sporting a "positive balance," yet retain flexibility to cater to the unique needs of the "negative balance" group.
- o Promotional Strategy:
  - Timing is of the essence. Capitalize on peak deposit acquisition times to fine-tune your campaigns.
  - Engage customers for longer periods to enhance campaign outcomes.

By integrating these findings, our marketing plan is primed for success, promoting both customer satisfaction and campaign effectiveness.

REFERENCE LIST

1. Klanten, R. (2008) Data flow: Visualising information in Graphic Design. Berlin: Gestalten.

2. H., E.S.D. (2020) Effective data visualization: The right chart for the right data. Thousand Oaks, CA: SAGE

Publications, Inc.

3. Gilbert, J.A. and Matthys, D.R. (1989) Characterization of fluid flow by digital correlation of scattered light.

Huntsville, AL: Univ. of Alabama in Huntsville.

4. Few, S. (2013) Information dashboard design: Displaying data for at-a-glance Monitoring. Eldorado Hills, CA:

Analytics Press.

5. Author links open overlay panelMax Hermann et al. (2015) A visual analytics perspective on shape analysis: State

of the art and future prospects, Computers & Graphics. Available at:

https://www.sciencedirect.com/science/article/pii/S0097849315001429.

 6. Understanding and using scatter plots (no date) Tableau. Available at: https://www.tableau.com/data-

insights/reference-library/visual-analytics/charts/scatter-plots.