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ENHANCING CUSTOMER ACQUISITION FOR EVD TECHNOLOGY

FINAL REPORT FOR THE BDM CAPSTONE PROJECT

Proposal by:

Yash Agrawal

Roll Number:

22f3003228

IITM Online BS Degree Program,
Indian Institute of Technology,
Madras, Chennai
Tamil Nadu, India, 600036

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Enhancing Customer Acquisition for EVD Technology

Executive Summary

EVD Technology, an IT solutions provider headquartered in Raipur, Chhattisgarh, specializes in web and mobile development, ERP/CRM systems, and digital marketing, serving clients across diverse industries. Established over a decade ago, EVD Technology has a strong track record of delivering digital transformation solutions, leveraging technologies such as Angular, React, and Node.js. However, recent challenges have emerged in their customer acquisition process, marked by slowing sales and reduced conversion rates.

In discussions with Anshu Agrawal, EVD Technology's Founder and CEO, two primary areas of focus were identified: optimizing conversion rates and pinpointing bottlenecks within the acquisition process. To tackle these, we analyzed LinkedIn Outbound Tracking and Detailed Lead Tracking data collected between March and June 2024, and, following the discovery of a bug affecting key metrics (Connection Request Accepted and CRA %), additional data from July to September 2024 was incorporated.

Our analytical approach includes trend analysis, correlation, funnel analysis, and A/B testing across platforms (Email, LinkedIn, and Social Media). The trend analysis revealed a decline in CRA % and Messages Responded metrics post-bug fix, indicating normalized performance levels and providing a clearer understanding of true engagement. A/B testing highlighted Email as the most effective platform, with conversion rates significantly higher than LinkedIn and Social Media, suggesting that a greater emphasis on Email could yield stronger results.

Our funnel analysis pinpointed key drop-off points, especially between Messages Sent and Messages Responded (77.4%) and Discovery Calls and Sales Calls (82.5%). These findings highlight areas where EVD Technology can optimize its outreach strategy to reduce attrition and improve lead quality. Recommendations include enhancing email outreach campaigns, refining LinkedIn strategies, and optimizing messaging scripts to improve engagement rates. By implementing these adjustments, EVD Technology can enhance conversion efficiency and better allocate resources for higher sales growth.

Detailed Explanation of Analysis Process/Method

1. Trend Analysis of Outbound Sales Metrics Over Time

Data Processing and Initial Inspection: Bug Trends

1. Missing Value Checks: Verified the dataset for any missing or null values in key metrics like **C Requests Accepted, CRA %, Messages Sent,** and **Message RR%**.
2. Preprocessing: checked dataset for missing values, handling outliers, and adjusting for any known data irregularities (e.g., bug impacts). Dates were grouped by both daily and weekly intervals for comparative analysis

Identification of Pre- and Post-Bug Trends

1. The analysis period included a known bug, fixed on June 30, 2024. Data was segmented into pre-bug and post-bug periods to observe shifts in values and more accurately assess performance post-fix.
2. Summary statistics, including daily averages and peak values, were calculated for each period, highlighting notable changes after the bug fix.

Moving Average Calculations

- To reduce day-to-day volatility and highlight broader patterns, a 7-day moving average was applied to each metric. This smoothed out short-term fluctuations and helped identify long-term trends.

- The moving average provided insight into both the general direction of trends and any cyclic patterns in messaging response and acceptance rates.

Comparative Trend Interpretation

- Both pre- and post-bug values, and weekly versus daily trends, were compared to evaluate the stability and consistency of the metrics.

- Conversion rates and response ratios were analyzed alongside historical averages to assess engagement efficiency and identify areas of potential improvement.

2. Correlation Analysis

Objective of Correlation Analysis: The purpose of this correlation analysis is to understand the relationships between the key metrics. By identifying any strong correlations between these variables, we aim to uncover potential interdependencies that can guide strategy and resource allocation.

Selection of Variables for Correlation Analysis:

- **Core Metrics**: We selected metrics central to understanding sales funnel effectiveness and user engagement, such as **Total Searches**, **C Requests Sent**, **C Requests Accepted**, **CRA %**, **Messages Sent**, **Messages Responded**, **Message RR%**, **Discovery Calls**, **Disco %**, **Sales Calls**, **Call %**, **Sales**, and **Conversion %**.
- **Rationale**: Each metric represents a crucial step in the sales and engagement funnel, making their relationships valuable for optimizing the overall outreach strategy.

Correlation Calculation:

- **Pearson Correlation Coefficient**: Calculated Pearson's correlation coefficient for each pair of metrics. This coefficient measures the linear relationship between two variables, with values ranging from -1 (perfect negative correlation) to +1 (perfect positive correlation). Values close to 0 indicate little to no linear relationship.
- **Interpretation Guide**:
    - **Strong Positive Correlation (0.7 to 1)**: Indicates that as one metric increases, the other tends to increase significantly, suggesting a close relationship.
    - **Moderate Correlation (0.4 to 0.7)**: Suggests a noticeable, though not extremely strong, relationship.
    - **Weak or No Correlation (0 to 0.4)**: Indicates minimal to no relationship between the metrics.

3. Funnel Analysis

Definition of Funnel Stages:

- **Stage Identification**: The funnel stages are based on the logical progression of engagement and sales interactions within the dataset. The stages typically begin with **Total Searches**, followed by **C Requests Sent** (connection requests), **C Requests Accepted**, **Messages Sent**, **Messages Responded**, **Discovery Calls**, **Sales Calls**, and **Sales** (final conversion).
- **Goal Alignment**: Each stage in the funnel represents a milestone towards the final objective (conversion). Defining these stages enables tracking of user journey milestones, highlighting key points where engagement is either lost or maintained.

Metric Selection and Preparation:

- **Key Metrics**: The primary metrics tracked at each stage include counts (e.g., number of connection requests sent, calls made), response rates (e.g., **Message RR%, Call %**), and conversion rates (e.g., **CRA %, Disco %, Conversion %**). These metrics are essential for understanding the effectiveness of each stage.
- **Normalization**: Where necessary, metrics were normalized to ensure comparability, particularly if certain stages involved different volumes or rates of engagement.

Stage-by-Stage Conversion Calculation:

- **Stage Transitions**: Calculated the conversion rate between each stage (e.g., **C Requests Sent** to **C Requests Accepted**) to quantify how well each stage is performing. This was done by dividing the number of successful actions at each stage by the preceding stage's total.

$$Converion\ Rate\ = \frac{Count\ at\ Current\ Stage}{Count\ at\ Previous\ Stage} \times 100$$

- **Cumulative Conversion Rate**: In addition to individual stage conversions, the cumulative conversion rate from the start (Total Searches) to the end (Sales) was calculated to provide a holistic view of the overall funnel efficiency.

$$Cumulative\ Conversion\ Rate\ = \frac{Sales}{Total\ C\ Requests\ Sent} \times 100$$

Drop-off and Attrition Rate Analysis:

- **Drop-Off Identification**: At each stage, calculated the drop-off rate to measure how many leads or interactions were lost. This is crucial for identifying points in the funnel where interest or engagement declines significantly.
- **Attrition Analysis**: Examined drop-offs in more detail, identifying reasons for attrition at each stage.

4. A/B Testing for Platform Effectiveness

The main objective of this A/B test is to determine which platform (Email, LinkedIn, or Social Media) yields the highest quality leads through the sales funnel stages. This involves analyzing the impact of each platform on various key metrics, including discovery calls, sales calls, and proposal acceptance rates, over a defined period (March-June).

Data Preparation and Cleaning

- **Filtering Relevant Data**: Extracted records from March to June for Discovery Call, Sales Call, Platform, and Proposal, focusing only on interactions initiated through the specified platforms.
- **Missing Value Handling**: Checked for any missing data in key columns. Missing data in critical fields (e.g., Platform or Proposal) was either imputed or filtered out to ensure accurate comparison.
- **Data Transformation**: Encoded categorical values where necessary (e.g., representing Proposal outcomes as binary values) to facilitate statistical testing.

```
data['Discovery Call'] = data['Discovery Call'].replace({"Done": 1}).fillna(0)
data['Sales Call'] = data['Sales Call'].replace({"Done": 1}).fillna(0)
data['Proposal'] = data['Proposal'].replace({"Not Sent": 0, "Sent": 1})

data.head()
```

	Profile	Location	Platform	Discovery Call	Sales Call	Proposal
0	TUSHAR MISHRA	Delhi	Email	1.0	1.0	1
1	Guncha Arora	Delhi	Email	0.0	1.0	0
2	Vaibhav Jain	Delhi	Email	1.0	1.0	1
3	Bipin Gaur	New Delhi	Email	1.0	0.0	0
4	Saurabh Singh	Delhi	Email	0.0	0.0	0

Figure 1: Encoded Categorical Values for Statistical Analysis

Hypothesis Formation:

- **Hypothesis Setup**: Formulated hypotheses to test for significant differences in performance between platforms.
    - **Null Hypothesis (H0)**: There is no significant difference in lead generation and conversion rates between platforms.
    - **Alternative Hypothesis (H1)**: At least one platform shows significantly different lead generation or conversion performance.
- **Statistical Significance**: Defined a significance level (α) of 0.05 for determining whether observed differences are statistically meaningful, meaning there is less than a 5% probability that observed differences are due to chance.

Statistical Testing and Analysis

- **Chi-Square Test for Independence**: The Chi-Square test to determine if there's a significant relationship between the platform (e.g., LinkedIn, email, social media) and conversion rates at each funnel stage. This test assesses if observed differences in outcomes across platforms are statistically meaningful.
- **ANOVA Test**: To further investigate the platform performance differences, an Analysis of Variance (ANOVA) test is conducted to compare the mean conversion rates across platforms. This test helps determine if there are statistically significant differences in conversion effectiveness across platforms, indicating variations in performance that could influence strategic decisions.
- **Post-Hoc Analysis**: Following a significant ANOVA result, a post-hoc Tukey test was performed to identify specific platform pairs with significant differences. This deeper analysis provides insights into which platforms perform better, allowing for a more nuanced understanding of platform effectiveness and guiding resource allocation accordingly.

Result and Finding

1. C Requests Accepted and CRA %:

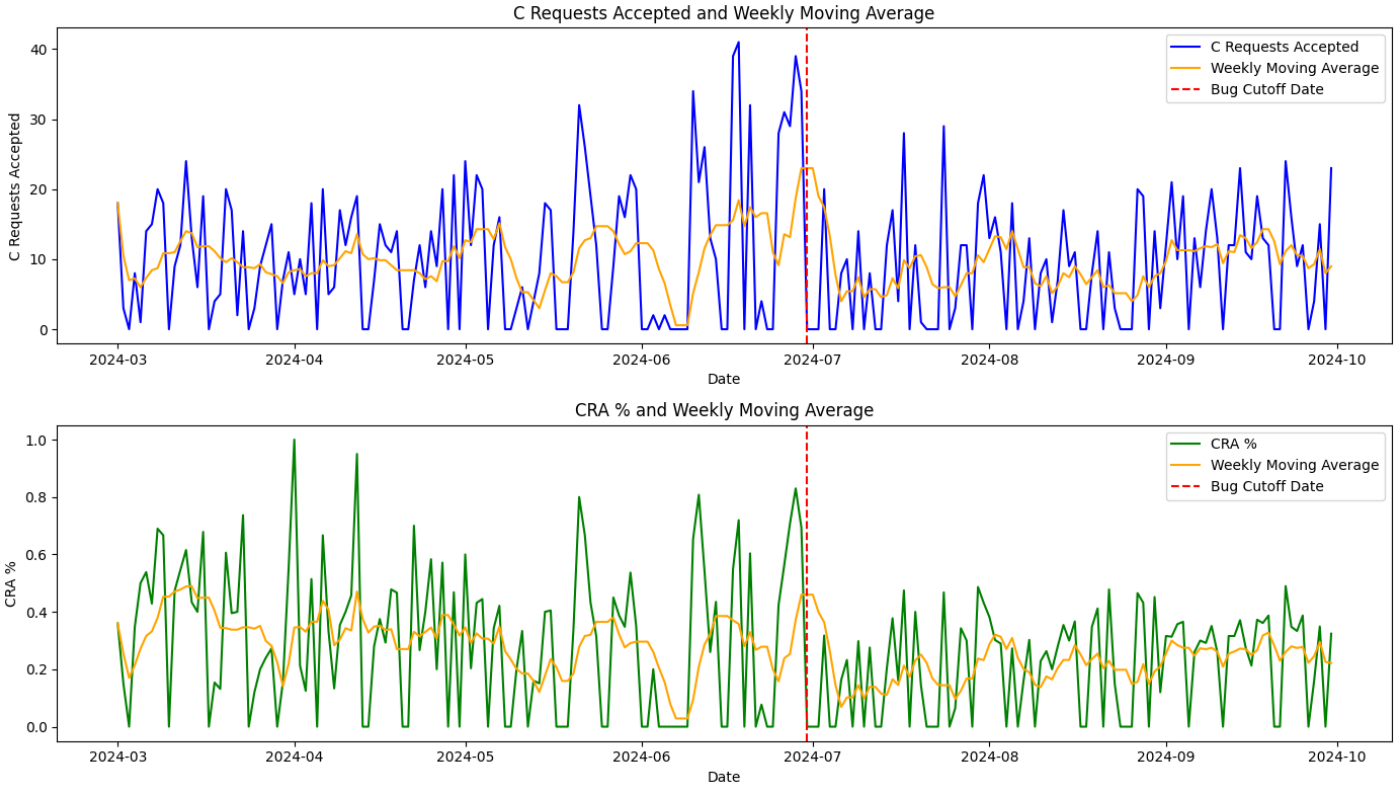

Figure 2: Daily and Weekly Moving Average of Connection Request Accepted and CRA%

The C Requests Accepted and CRA % metrics show a noticeable shift around June 30, 2024. Prior to this date, both metrics were inflated, due to a known bug, leading to unusually high values. After the bug was fixed, these metrics normalized, showing a consistent decrease in both C Requests Accepted and CRA %.

- C Requests Accepted:
  - Pre-Bug Fix: Averaged around 10.79 requests per day, with peaks reaching up to 41 requests on certain dates.
  - Post-Bug Fix: Settled to an average of 8.72 requests per day, showing a 19.18% drop from the inflated values. The weekly moving average after June 30 presents a stable downward trend, more accurately capturing typical performance.
- CRA %:
  - Pre-Bug Fix: CRA % exhibited an inflated average of approximately 40.9%, with some days peaking around 100%.
  - Post-Bug Fix: The CRA % stabilized to an average of 32.3%, reflecting a 21.02% decline, indicative of more accurate conversion levels.

2. Messages Responded and Message RR%:

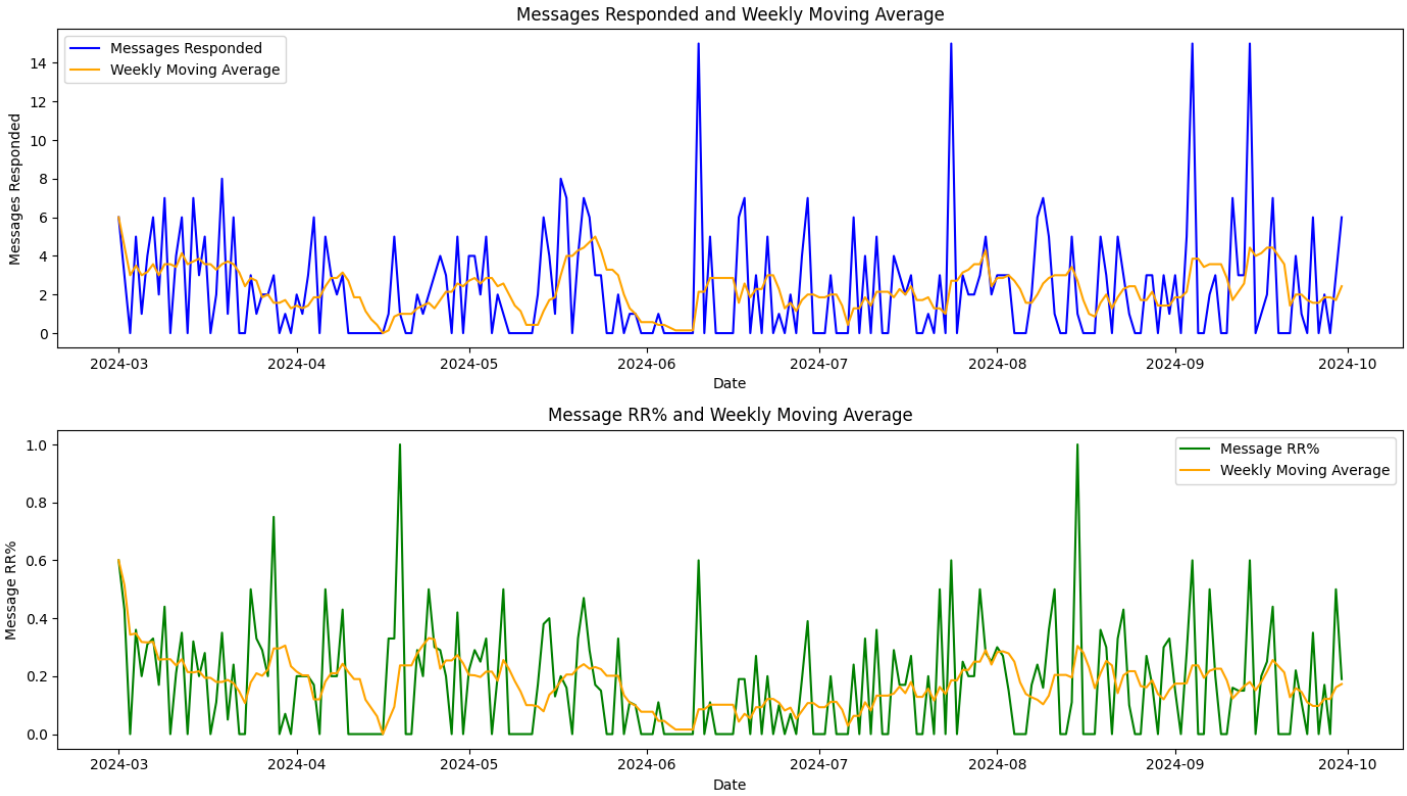

Figure 3: Daily and Weekly Moving Average of Message Responded and Message RR%

The Messages Responded and Message RR% metrics exhibit significant volatility throughout the analysis period, reflecting fluctuations in messaging activity and response efficiency.

1. **Messages Responded:**
   - Volatility in Volume: Frequent spikes and drops in response volume, reaching as high as 15 responses on peak days and drop to zero on other days, suggest demand shifts or external factors influencing messaging volume.
   - Weekly Moving Average: The weekly moving average helps reveal underlying trends despite day-to-day fluctuations, showing periodic spikes that suggest irregular response cycles rather than steady patterns.

2. **Message RR%:**
   - Fluctuations in Response Rate: Message RR% also varies significantly, sometimes reaching 100% but often dropping to much lower levels, indicating operational or priority-driven response variability.
   - Weekly Moving Average: The weekly moving average shows a general but irregular trend, with variations indicating cycles or shifts in engagement strategy rather than a stable increase or decrease in response rates.

3. Correlation Analysis:

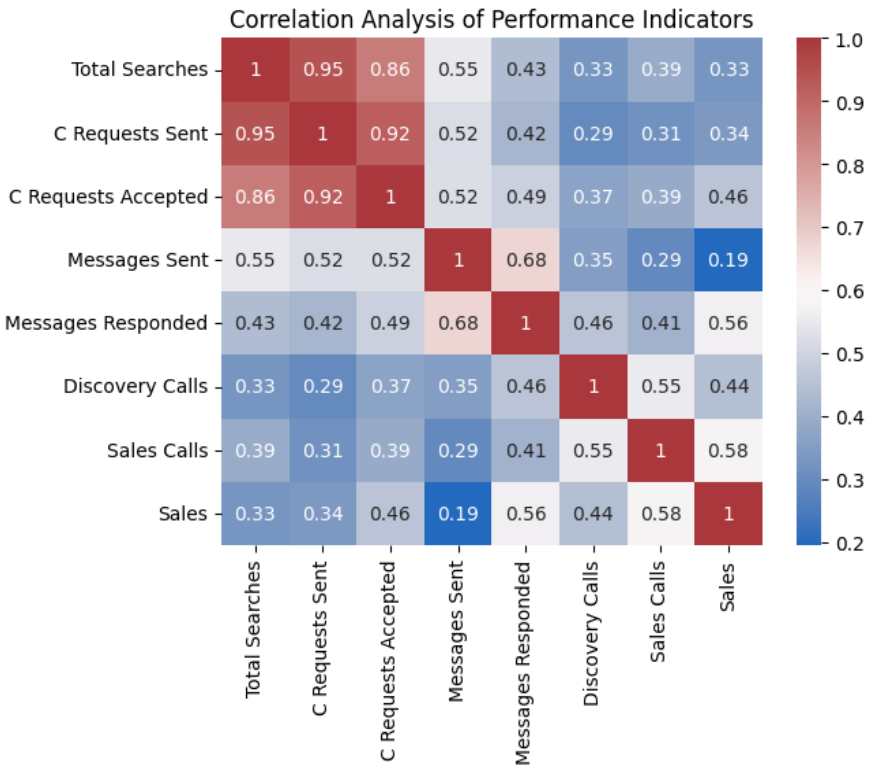

Figure 4: Heatmap Visualization of Relationships Between Performance Metrics

Strong to Moderate Positive Correlations:

- Total Searches and C Requests Sent (0.95), Total Searches and C Requests Accepted (0.86): Indicates that as search volume rises, so do requests sent and accepted.
- Messages Sent and Messages Responded (0.68): Suggests that higher message volume is moderately effective at generating responses. A 10% increase in Messages Sent is likely to increase Messages Responded by around 6.8%, showing potential for growth but also highlighting inefficiency in message response.
- Messages Responded and Sales (0.56): Implies that responses to messages influence sales outcomes moderately. For every 10% increase in responses, there could be a **5.6% increase** in sales, underlining the importance of timely responses to drive sales growth.
- Sales Calls and Sales (0.58): indicating that each 10% increase in sales calls may contribute a **5.8% increase** in final sales, highlighting sales calls as an essential component in driving conversions.

Lower Positive Correlations:

- Total Searches, C Requests Sent, and Messages Sent have weaker correlations with Sales (values below 0.4): Indicates limited direct impact on sales. Specifically, *Total Searches* correlates at **0.33** with *Sales*, suggesting that search volume alone explains only a small part (about **3.3%** increase per 10% rise) of sales variations, making it less effective for directly driving sales growth.

4. Funnel Analysis:

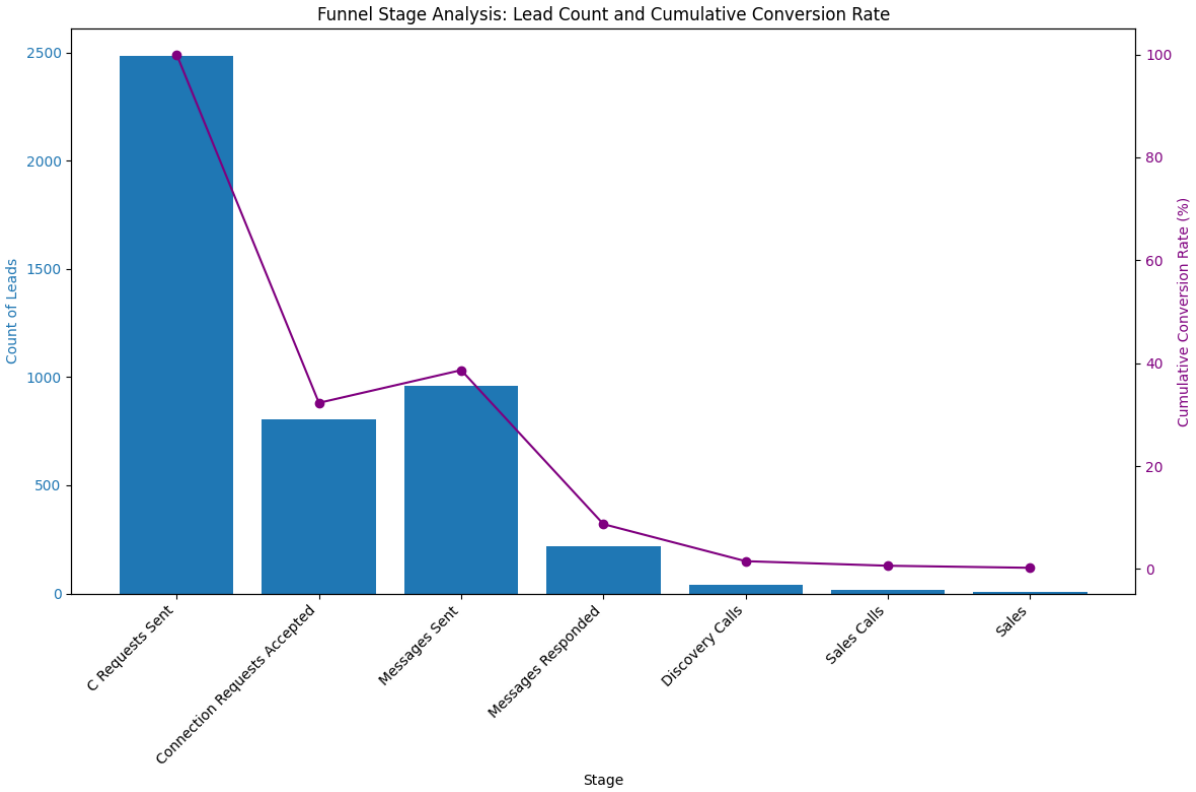

Figure 5: Lead Count and Cumulative Conversion Rate by Funnel Stage

C Requests Sent to Connection Requests Accepted:

- Only 32.3% of the initial connection requests were accepted.
- This indicates a significant drop-off at the first stage of the funnel, where around 67.7% of requests were not accepted.

Connection Requests Accepted to Messages Sent:

- The number of messages sent is slightly higher than the accepted connections, showing a 19.7% increase.
- This could suggest that follow-up or additional messages were sent to previously accepted connections.

Messages Sent to Messages Responded:

- Only 8.7% of the original pool received responses, with a substantial drop-off rate of 77.4%.
- This indicates a low response rate, with only a small proportion of recipients engaging further.

Messages Responded to Discovery Calls:

- Of those who responded to messages, only 1.5% progressed to discovery calls, showing a sharp drop-off rate of 82.5%.
- This stage indicates a challenge in converting initial interest into deeper engagement.

Discovery Calls to Sales Calls:

- Only 0.6% reached the sales call stage, with a drop-off rate of 57.9%.
- While a smaller drop-off compared to previous stages, it still highlights a need for improvement in transitioning discovery calls into sales calls.

Sales Calls to Final Sales:

- Ultimately, 0.24% of the initial pool resulted in a sale, with a 62.5% drop-off from sales calls to final sales.
- This indicates a high rate of attrition before final conversion.

Note: Due to a known bug affecting the **Connection Request Accepted** and **CRA %** metrics, only data from **July to September** has been included in the funnel and correlation analyses. This period was selected to ensure accuracy and consistency in the results.

5. Chi-Square Test for Independence:

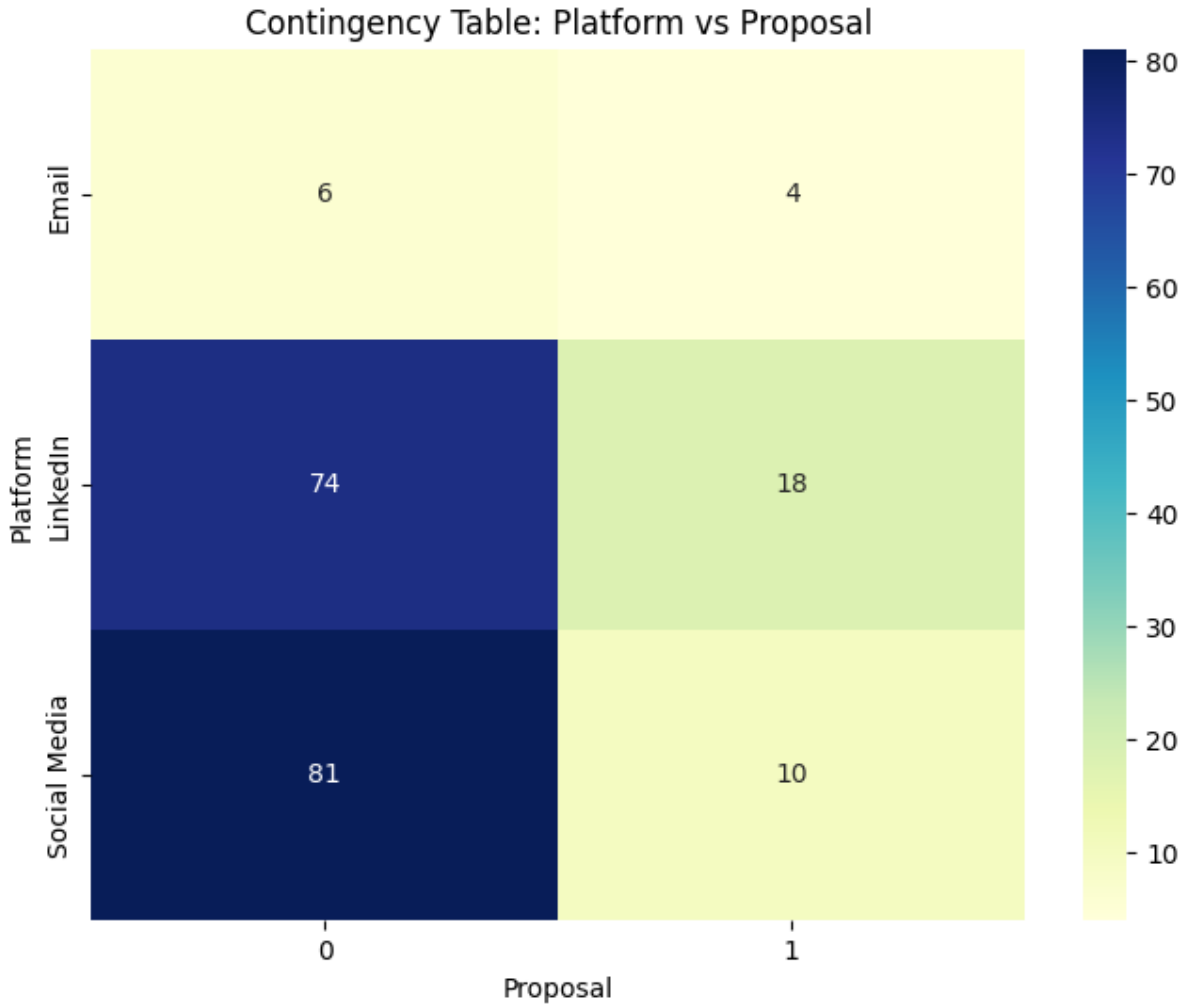

Figure 6:Contingency Table: Platform vs. Proposal

Chi-Square Test Results	
Chi2 Statistic	6.6150
P-value	0.0366

- The chi-square test revealed a statistically significant association between the platform and conversion rates at various funnel stages, with a Chi2 statistic of 6.62 and a p-value of 0.037 ($p < 0.05$).
- This suggests that the conversion outcomes differ significantly depending on the platform. In terms of raw counts:
  - **Email**: 6 conversions out of 10 attempts (40% conversion rate).
  - **LinkedIn**: 18 conversions out of 92 attempts (19.6% conversion rate).
  - **Social Media**: 10 conversions out of 91 attempts (10.9% conversion rate).

6. ANOVA Test:

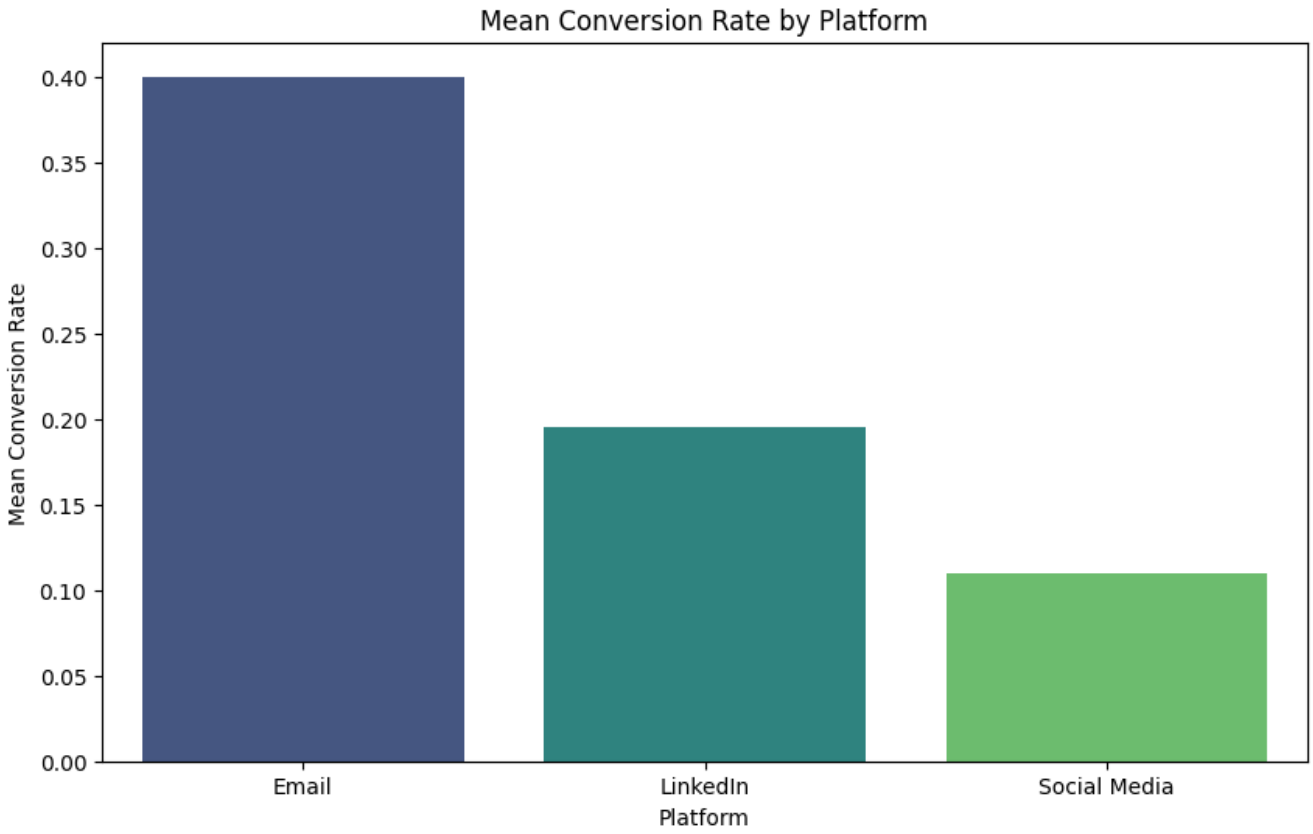

Figure 7: Bar Plot of Mean Conversion by Platform (ANOVA Test)

ANOVA Test Results				
	sum_sq	df	F	PR(>F)
C(Platform)	0.9149	2.0	3.3716	0.0364
Residual	25.7793	190.0	NaN	NaN

- The ANOVA analysis indicated a significant difference in mean conversion rates across platforms (F = 3.37, p = 0.036).
- The average conversion rates for each platform were approximately:
  - **Email**: 40%
  - **LinkedIn**: 19%
  - **Social Media**: 10.9%
- This confirms that platforms have different conversion rates, with Email performing best, followed by LinkedIn, and then Social Media.

7. Post-Hoc Tukey HSD Test:

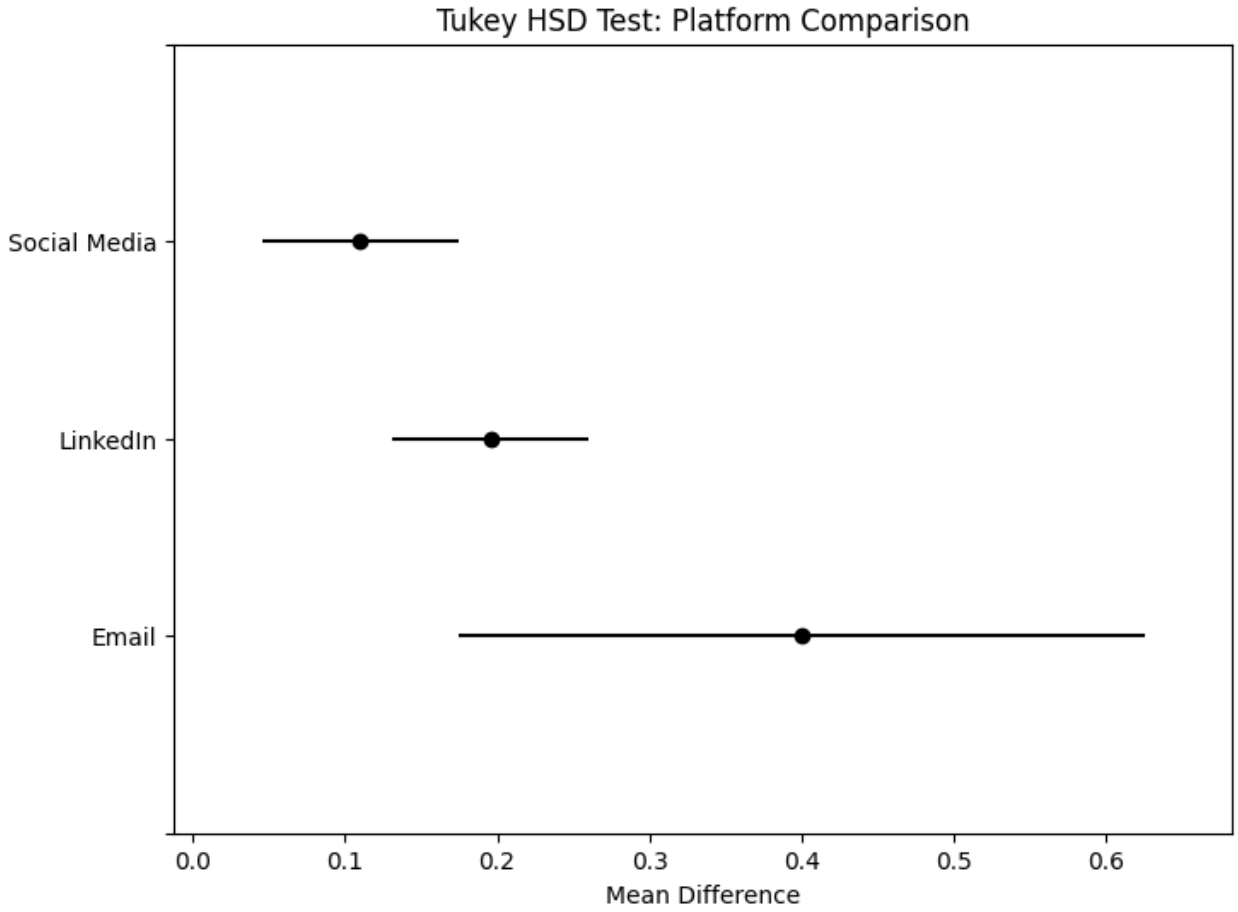

Figure 8: Post-Hoc Tukey HSD Test: Platform Comparison

Tukey Post-Hoc Test Results
Multiple Comparison of Means - Tukey HSD, FWER=0.05

group1	group2	meandiff	p-adj	lower	upper	reject
Email	LinkedIn	-0.2043	0.221	-0.4941	0.0854	False
Email	Social Media	-0.2901	0.0498	-0.58	-0.0002	True
LinkedIn	Social Media	-0.0858	0.2591	-0.2144	0.0429	False

- The Tukey HSD test provided specific insights into pairwise differences:
  - **Email vs. Social Media**: The difference in conversion rates between Email and Social Media is statistically significant (p = 0.0498). Email has a notably higher conversion rate.
  - **Email vs. LinkedIn** and **LinkedIn vs. Social Media**: These pairs did not show statistically significant differences, indicating that while LinkedIn performs better than Social Media, the difference is not statistically meaningful at the chosen significance level.

Interpretation of Findings and Recommendations

Interpretation of Findings:

Our analysis reveals distinct platform performances in terms of conversion rates, with Email emerging as the most effective channel, converting at approximately 40%, significantly higher than LinkedIn (19.6%) and Social Media (10.9%). The ANOVA test further supports these differences as statistically significant, indicating that platform choice plays a meaningful role in conversion success.

- Email: The post-hoc Tukey HSD test demonstrates a significant difference in conversion between Email and Social Media ($p = 0.0498$), highlighting Email's potential as the most productive medium.
- LinkedIn: Though less effective than Email, LinkedIn's 19.6% conversion rate suggests it can be a valuable secondary channel.
- Social Media: With the lowest conversion rate at 10.9%, Social Media appears less effective in driving conversions through this funnel, implying limited ROI for conversion-focused efforts on this platform.

Trend analysis further underscores the impact of a bug fix implemented on June 30, 2024. Metrics such as C Requests Accepted and CRA % show inflated values before this date, normalizing post-fix with noticeable declines. This indicates that the pre-bug data may overestimate engagement, while the post-bug data reflects more accurate performance levels, emphasizing the need for consistent data monitoring.

The funnel analysis highlights notable drop-off points, especially from Connection Requests Accepted to Messages Sent (67.7% drop-off), from Messages Sent to Messages Responded (77.4% drop-off) and from Messages Responded to Discovery Calls (82.5% drop-off). These stages represent significant opportunities for optimization, particularly in messaging template discovery call script to improve engagement and responses.

Recommendations for Business Improvement:

1. **Increase Investment in Email Campaigns:**

    - Given its conversion success, focusing on Email as the primary channel could lead to higher lead generation and sales. Consider scaling up Email campaigns with personalized content and further A/B testing of email formats, subject lines, and call-to-action placements to maximize conversion potential.

    - Expected Impact: Leveraging the 40% conversion rate of Email could improve total conversions, especially if resources are reallocated from lower-performing channels.

2. **Enhance LinkedIn Campaigns:**

    - With a moderate conversion rate, LinkedIn holds promise as a secondary channel. To optimize, refine LinkedIn outreach by leveraging platform-specific features like advanced targeting, sponsored content, and InMail.

    - Expected Impact: Improving LinkedIn strategies could increase its conversion rate by a few percentage points, adding incremental gains to total conversions.

3. **Reassess Social Media Strategy:**

    - Social Media's low conversion rate suggests it may be better suited for brand awareness rather than direct sales. Reevaluate the current approach by shifting focus from direct conversions to awareness and engagement goals.

    - Expected Impact: This shift could allow more focused resources on channels with higher conversion rates, thereby improving overall campaign efficiency.

4. **Lead Funnel Optimization:**

    - **Improve Connection Request Acceptance Rate** (67.7% drop-off) by refining the connection request approach, such as by personalizing each request or by targeting higher-quality leads.

- **Boost Message Engagement** (77.4% drop-off) through follow-up reminders and strategic messaging campaigns, which may help convert responses to meaningful discussions.

- For **Messages Responded to Discovery Calls** (82.5% drop-off), tailoring the script to better address prospects' immediate needs and pain points can make calls feel more relevant, enhancing engagement. Also, including specific examples of value or quick wins they could expect might improve the likelihood of progression from initial interest to a deeper conversation.

5. **Refine Messaging and Engagement Strategy:**

    - The analysis revealed high attrition between the initial connection requests and responses. Optimizing message content to improve response rates could help retain leads through the funnel, potentially reducing the 77.4% drop-off at the Messages Responded stage.

    - Expected Impact: Small improvements in engagement rates at critical drop-off points can cumulatively increase funnel throughput, leading to higher final sales.

6. **Further Platform-Specific Experimentation:**

    - Implement targeted A/B testing on Email and LinkedIn to explore the specific messaging, timing, and audience segments that perform best. Additionally, experimenting with retargeting for LinkedIn users who have shown initial engagement can help capture interest that did not immediately convert.

    - Expected Impact: Identifying and applying platform-specific best practices could boost conversion rates, especially on LinkedIn, and enhance lead retention across stages.

Important Link

1. LinkedIn Outbound Tracking – Dataset1
2. Lead Tracking – Dataset2
3. Google Collab Notebook