**Final Report: A/B Testing Analysis**

**1. Introduction**

This report presents the findings from an A/B testing analysis conducted to evaluate cart conversion rates (CCR) between two groups, Group A and Group B, and to identify trends in daily conversion rates. The goal is to provide actionable insights to optimize cart creation strategies.

**2. Methodology**

**Dataset Overview**

The dataset includes the following columns:

* **location\_country**: Country of the visitors.
* **day**: Day of the experiment.
* **total\_visitors**: Total number of visitors.
* **total\_carts**: Total number of carts created.
* **cart\_conversion\_rate**: Calculated as:

**Steps Conducted**

1. **Data Cleaning**: Missing values and zero visitors were removed.
2. **Group Definition**: Two groups were defined based on location:
   * **Group A**: North America (e.g., United States, Canada).
   * **Group B**: Middle East (e.g., Saudi Arabia, UAE).
3. **Statistical Testing**: A t-test was used to compare CCR between the two groups:
   * **Null Hypothesis (H₀):** No significant difference in CCR between Group A and Group B.
   * **Alternative Hypothesis (H₁):** Significant difference in CCR between the groups.
4. **Trend Analysis**: Daily CCR trends were analyzed to identify high and low-performing days.

**3. Results**

**Group Comparison**

* **Group Sizes:**
  + Group A: 71–72 samples.
  + Group B: 232–238 samples.
* **Statistical Test Results:**
  + **T-statistic:** -2.43
  + **P-value:** 0.0159

**Conclusion:** Group B has a significantly higher cart conversion rate than Group A (p-value < 0.05).

**Daily Trends**

|  |  |
| --- | --- |
| **Day** | **Cart Conversion Rate (%)** |
| 1 | 13.74 |
| 10 | 35.71 |
| 11 | 20.78 |
| 12 | 0.00 |
| 15 | 1.36 |
| 21 | 2.08 |

* **Highest CCR:** Day 10 (35.71%).
* **Lowest CCR:** Day 12 (0.00%).
* **Steady Performance:** Most days hover between 9% and 20%.

**4. Visualizations**

**4.1 Boxplot: Group Comparison**

The boxplot shows that Group B has a higher median cart conversion rate compared to Group A.

**4.2 Line Plot: Daily CCR Trends**

The line plot highlights fluctuations in CCR over 21 days, with Day 10 showing the highest performance.

**4.3 Bar Charts: High and Low Performing Days**

* Top 3 Days: Days 10, 11, and 5.
* Bottom 3 Days: Days 12, 16, and 15.

**5. Insights**

1. **Group B Performance:**
   * Group B’s strategy significantly outperforms Group A in cart conversion rates.
2. **Daily Trends:**
   * Days 10 and 11 show exceptionally high conversion rates, suggesting potential promotional activities or favorable user behavior.
   * Day 12 had no cart conversions, indicating an issue that warrants investigation.

**6. Recommendations**

1. **Adopt Group B’s Strategy:**
   * Implement Group B’s interventions across all regions to improve cart conversions.
2. **Leverage High-Performance Days:**
   * Analyze activities on Days 10 and 11 to replicate successful strategies in the future.
3. **Investigate Low-Performance Days:**
   * Examine factors contributing to poor performance on Day 12 and address potential issues (e.g., technical errors, low traffic).
4. **Monitor Daily Trends:**
   * Continuously track cart conversion rates to identify trends and refine strategies.

**7. Conclusion**

This analysis demonstrates the effectiveness of Group B’s approach in driving cart conversions. By adopting Group B’s strategies and addressing underperforming areas, significant improvements can be achieved in overall cart creation rates.