

Vanguard[®]

DIGITAL EXPERIMENT

DATA INSIGHTS

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Introduction

WHAT

Redesign the UI and validate the new online process with A/B testing.

WHO

Amateur investors purchasing ETFs.

WHY

Improve the user experience to increase both customer conversions and business revenue.

GOAL

Determine whether the new UI generates a higher completion rate?

Data Overview

Client Profiles

- Age
- Gender
- Account details

Digital Footprints

- Client ID
- Visitor ID
- Visit ID
- Process steps
- Date and Time

Experiment Roster

	client_id	Variation
0	9988021	Test
1	8320017	Test
2	4033851	Control
3	1982004	Test
4	9294070	Control
5	9466803	Test
6	3170143	Test
7	6651403	Control
8	5887227	Test
9	2105948	Control
10	438567	Test

Data Cleaning and Merging

1. Checked null values in each column
2. Removed rows with insufficient detail
3. Removed duplicate rows
4. Merged x into unknown
5. Renamed columns
6. Vertically concat the 2 web files into 1 dataframe
7. Merged the web and variation data
8. Merged datasets for Tableau

Experiment Design

A/B Test

- **Control Group:** Clients interacted with Vanguard's traditional online process.
- **Test Group:** Clients experienced the new, spruced-up digital interface.

Timeframe

- **98 Days:** 15.03.2017 to 20.06.2017

Key Variables

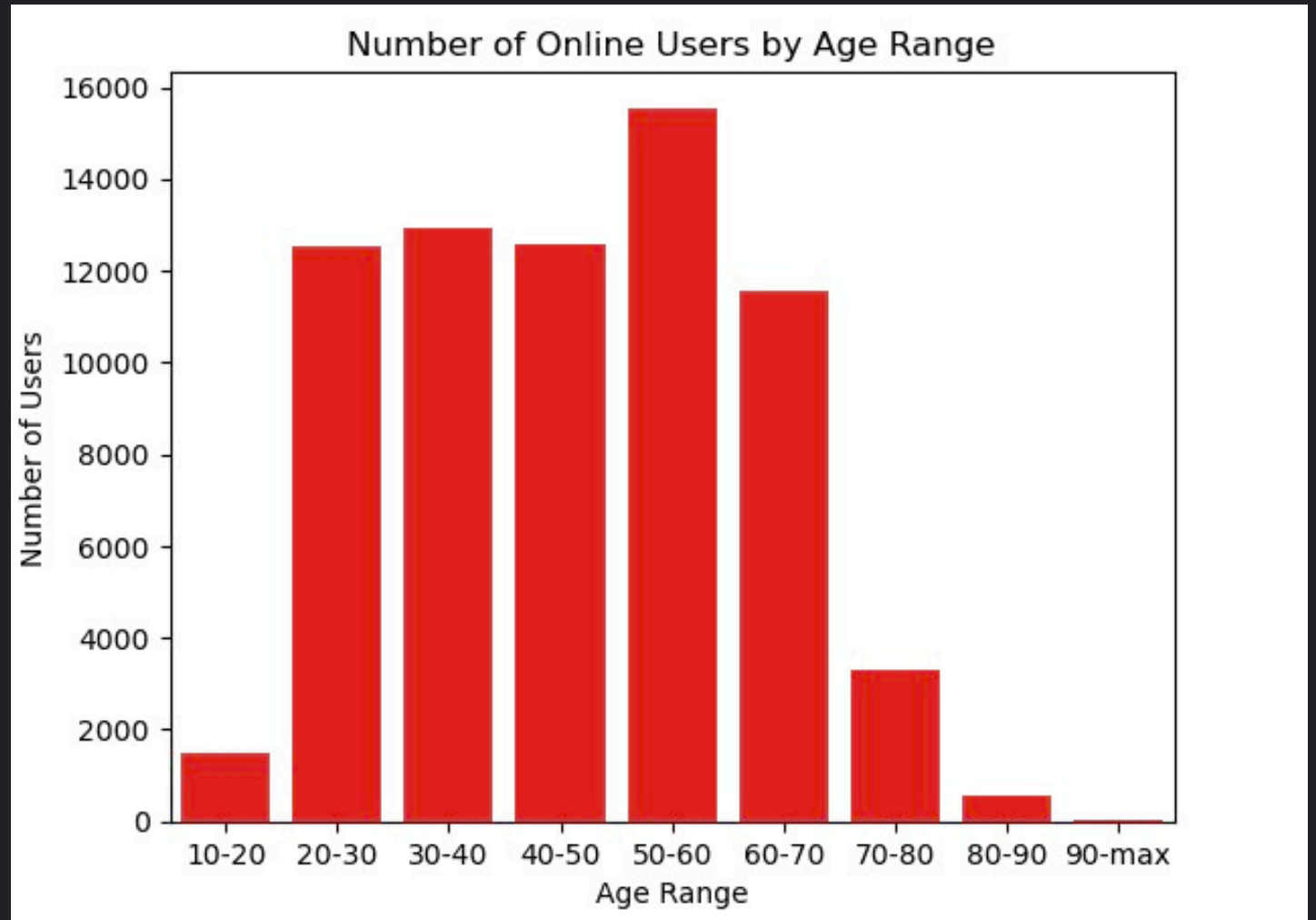
- **Time Spent on Each Step:** The average duration users spend on each step.
- **Error:** If there's a step where users go from a later step back to a previous step this will indicate an error.
- **Completion Rate:** The proportion of users who reach the final 'confirm' step.
- **Process steps:** Marks each step in the digital process



Exploratory Data Analysis (EDA)

are *primary clients*
younger or older?

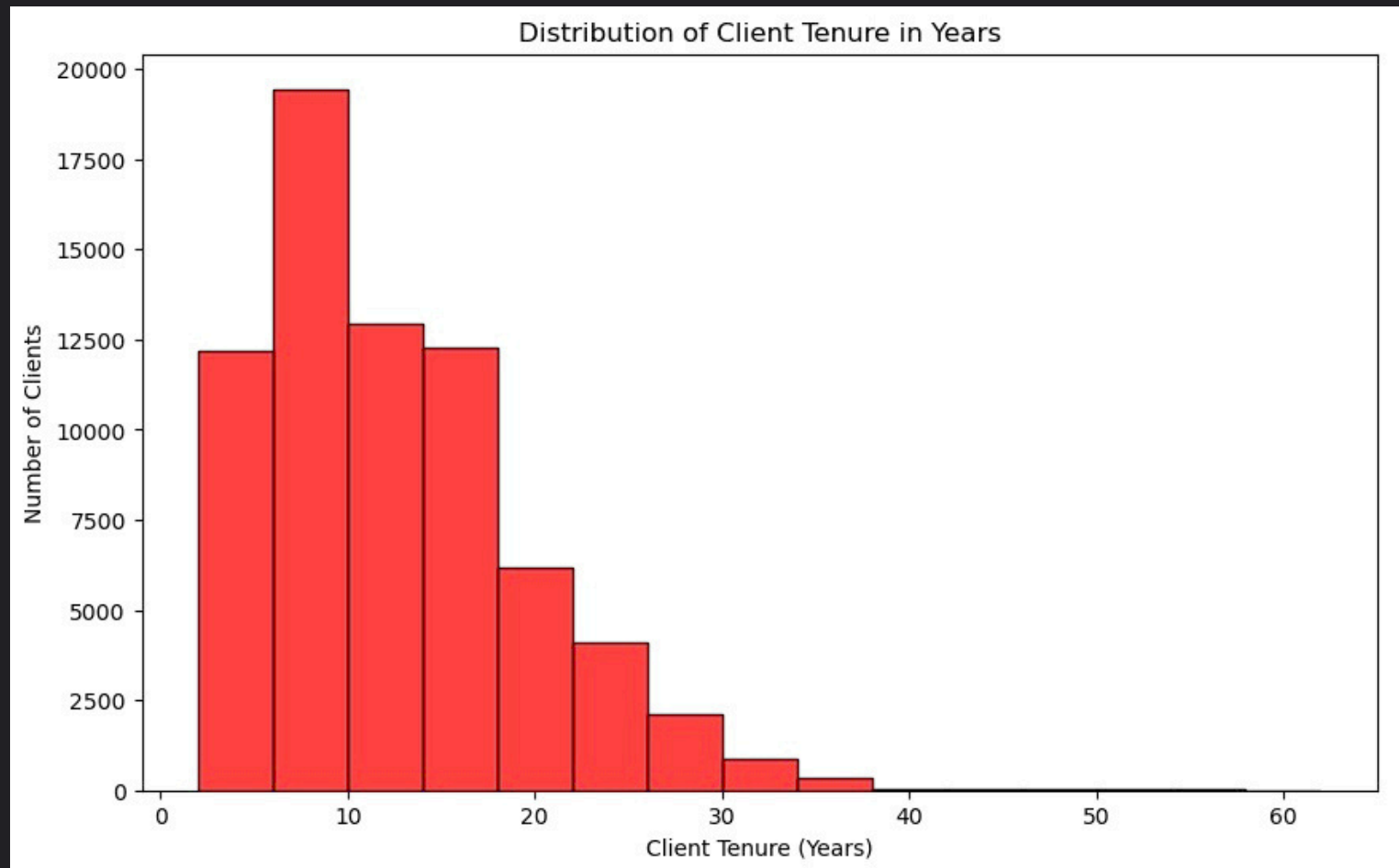
	clnt_age
count	70594.000000
mean	46.180426
std	15.600390
min	13.000000
25%	32.000000
50%	47.000000
75%	59.000000
max	96.000000



Exploratory Data Analysis (EDA)

min(2 years), mode (6 years), max (62 years)

	clnt_tenure_yr
count	70595.000000
mean	12.052950
std	6.871819
min	2.000000
25%	6.000000
50%	11.000000
75%	16.000000
max	62.000000



KPI: Completion Rate

TEST

58.52%

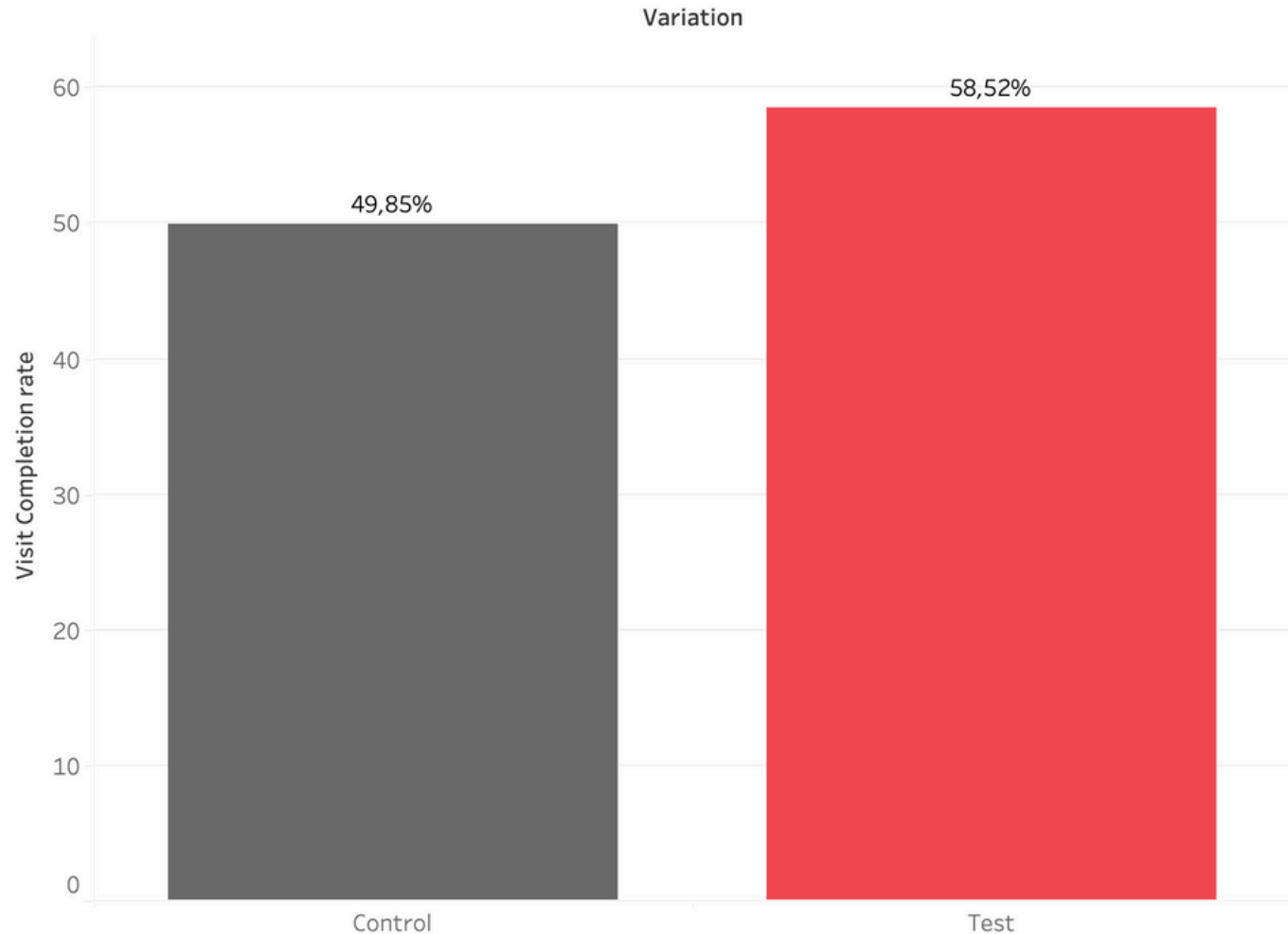
↑8.67%

COMPLETION RATE

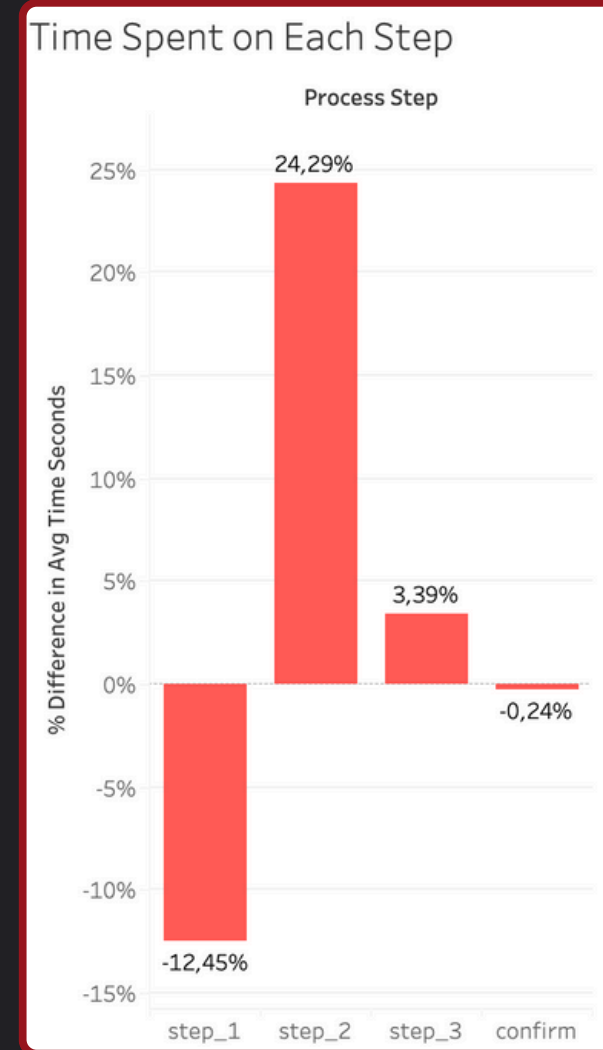
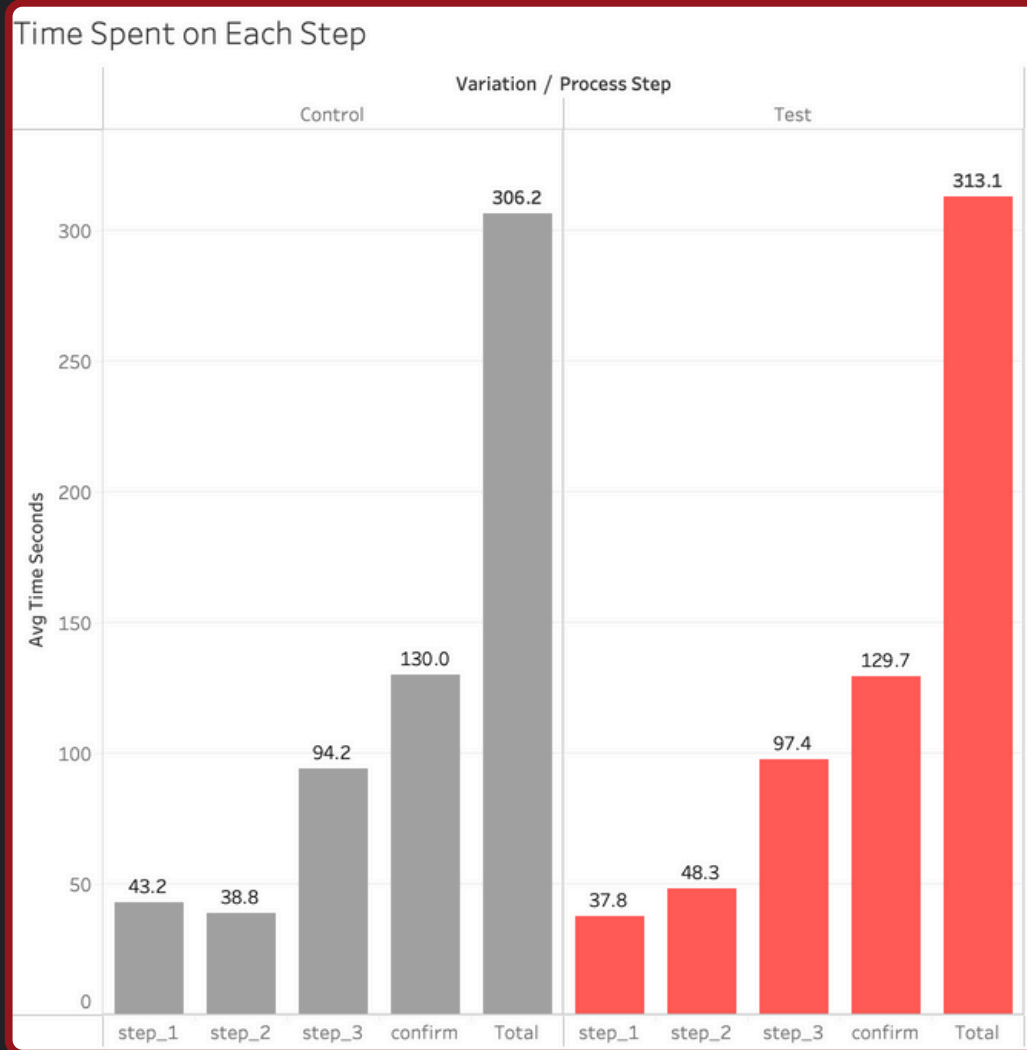
49.85%

CONTROL

Visit Completion Rate



KPI: Time Spent per Step



Performance Metrics

TEST

27.03%

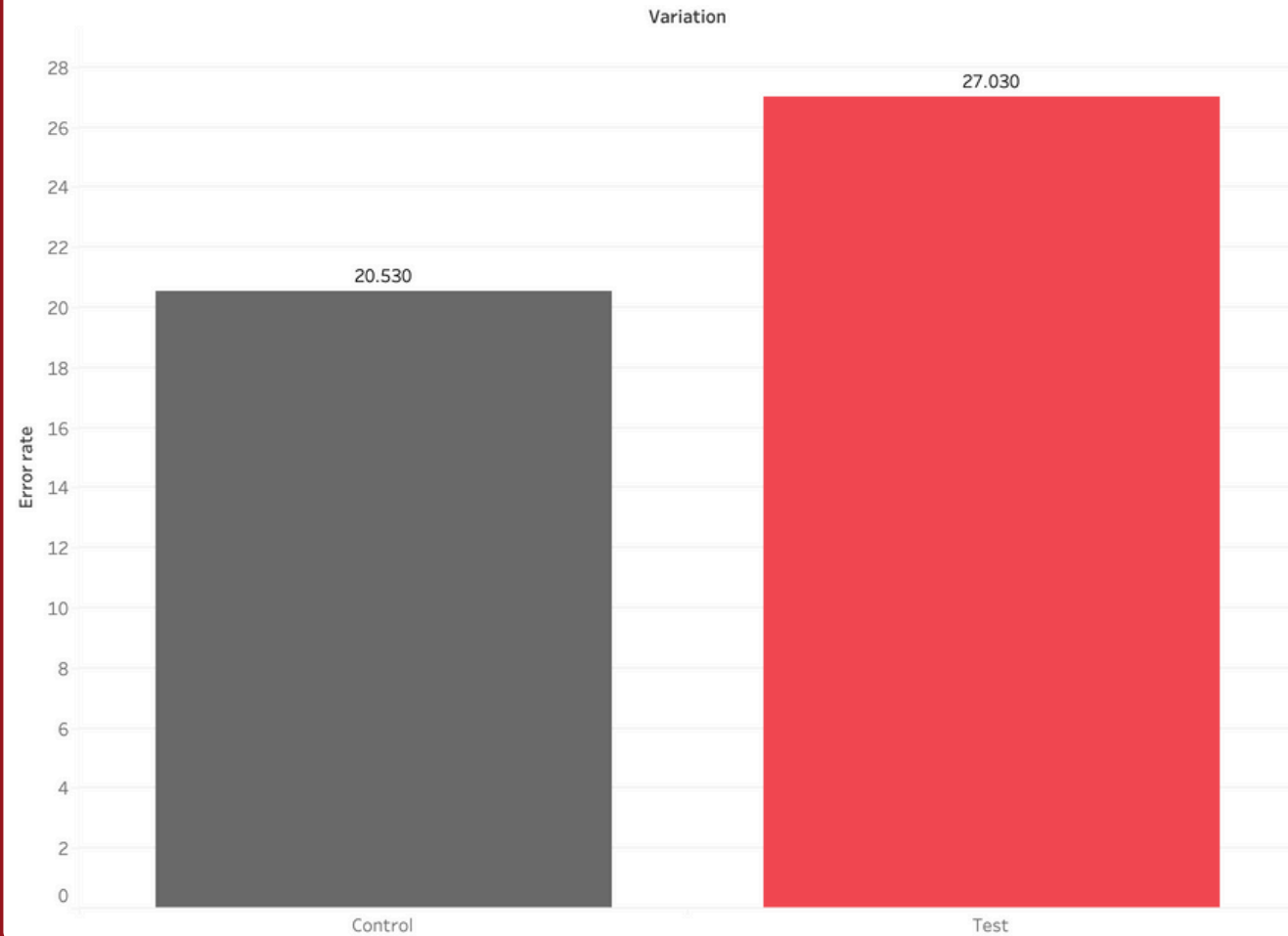
↑6.5%

ERROR RATES

20.53%

CONTROL

Error Rate



Hypothesis Testing

H_0 : The Control Group has a higher completion rate compared to the Test Group.

H_1 : The Test Group has a higher completion rate compared to the Control Group.

KPIs = Completion Rate (Cr)

- Cr Test group > Cr Control group

Hypothesis Testing = Proportion Z-Test
with alpha = 0.05

Results =

P-value: 6.24e-116

Reject H_0

- Cr Test group > Cr Control group

Hypothesis Testing

H₀: Completion Rate for Test is more than Completion Rate for Control, but less than 5%.

H₁: Completion Rate for Test is higher than Completion Rate Control, by 5% or more.

Cr Test-Group > Cr Control Group, plus 5% level of improvement.

Hypothesis Testing = Proportion Z-Test
alpha = 0.05.
Threshold: 0.05

Results =

P-value: 1.97e-22

Reject H₀

- Cr Test group > Cr Control group, plus 5% level of improvement.

Hypothesis Testing

H₀: The error rates for the new design is lower than the old design.

Error rate (Test) \leq Error rate (Control)

H₁: The error rates for the new design is higher than the old design.

Error rate (Test) $>$ Error rate (Control)

Hypothesis Testing = T-Test

alpha = 0.05. P-value $>$ alpha then Fail to reject H₀.

Results

T-stat = 21.92

P-value: 1.88e-106

Reject H₀

We reject the null hypothesis.

Therefore the error rates for the new design is higher than the old design.

Tableau Visualizations

Drop-off rates

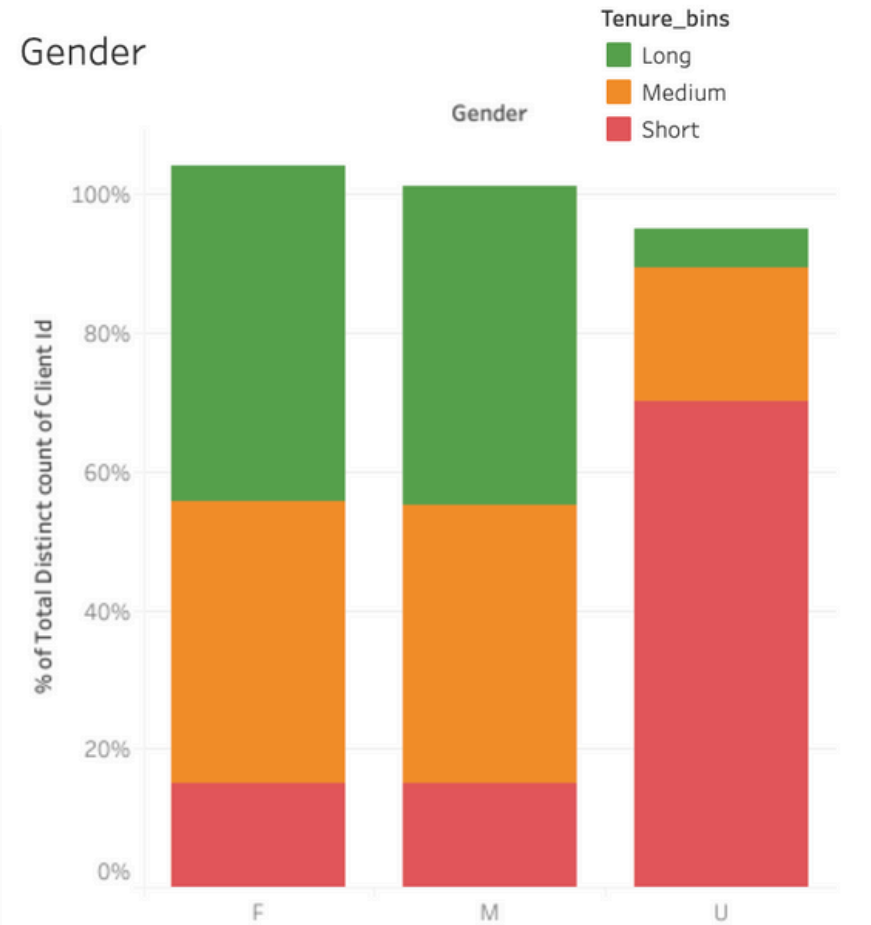
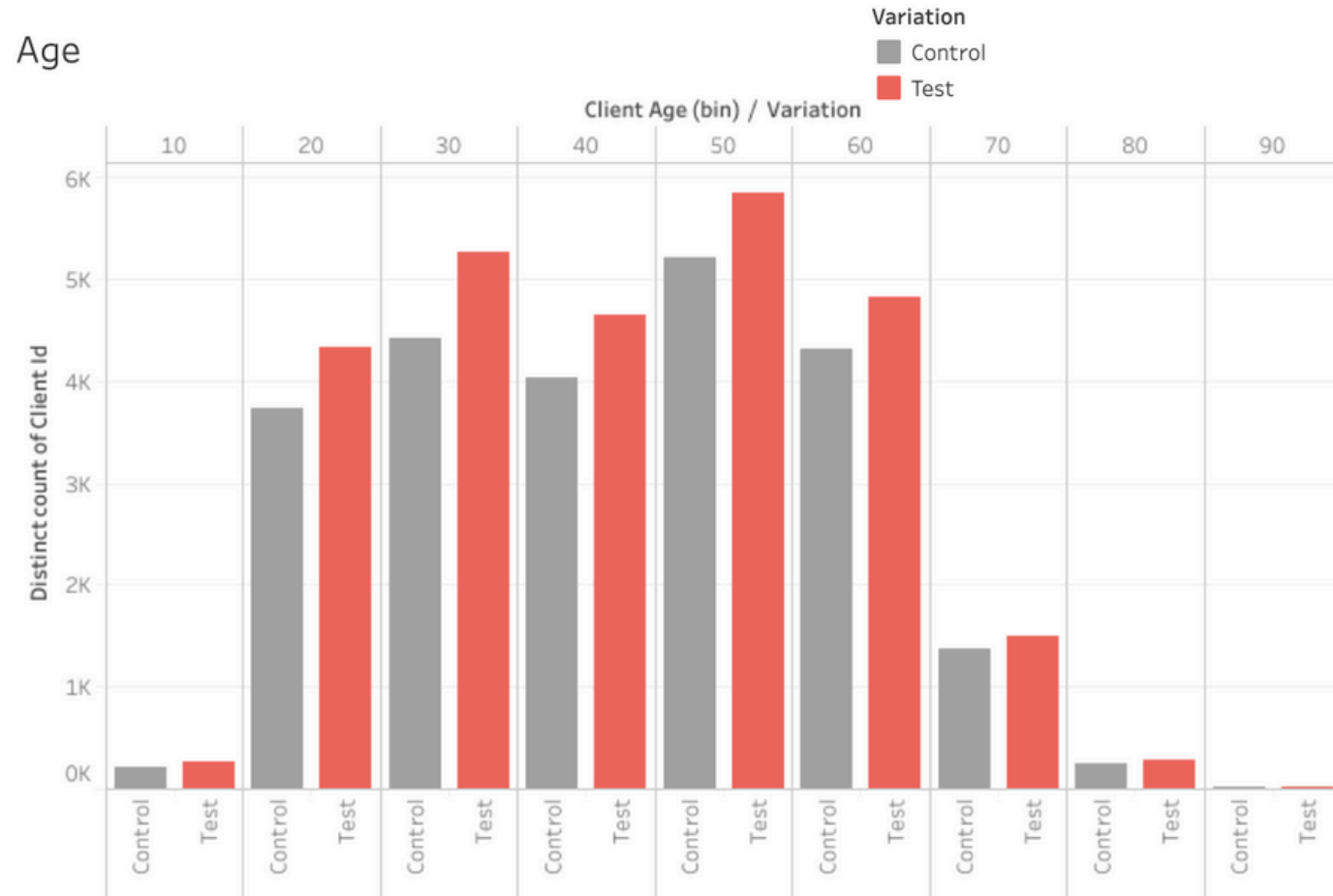
Unique Visits per Step



Drop-off Rate per Step



Tableau Visualizations



Experiment Evaluation

- The design of Vanguard A/B test runs for more than 3 months. The best practice is to let a A/B test run for a minimum of 2 weeks and no longer than 8 weeks.
- As a potential bias, we can add that number of users for each group is not equally distributed. Test group has more users than Control group.

Missing Fields

For troubleshooting and understanding web activity:

- Device data
- Operating system (OS)
- Error types

For additional insights into our customer base:

- Unknown Sex to be populated
- Employment Status
- Relationship Status
- Income
- Residency Status

Conclusion

- Overall, there is a substantial amount of evidence supporting the effectiveness of the new design, with the KPI and Hypothesis testing both reflecting an upward tick in the completion rate.
- More investigation into the error rates will be required to better understand the nature of these errors and whether a fix will need to be implemented. The same applies for time per step.
- For the next iteration of the A/B testing it would be good to add the additional suggested fields and ensure that the experiment is more equal in its distribution.