Changes in the User Interface-UI in Vanguard Investment Company

By Angie M

Introduction

Vanguard is a US investment management company, located in the US. They did a digital experiment in their User interface. The main idea was to try to make it more intuitive and modern to make the online process smoother for the clients.

The question is:

¿Would the changes lead to a better user experience and a higher process completion?

Data Overview

- **Clients Profiles:**

  With relevant information such as age, the time being a client, gender, and balance

  - One file with 70.609 rows and 9 columns

- **The online interaction (from 15Mar17 until 20Jun17):**

  With information such as visitor and visit ID, the steps of each process, and the date and times

  - One file with 343.141 rows and 5 columns
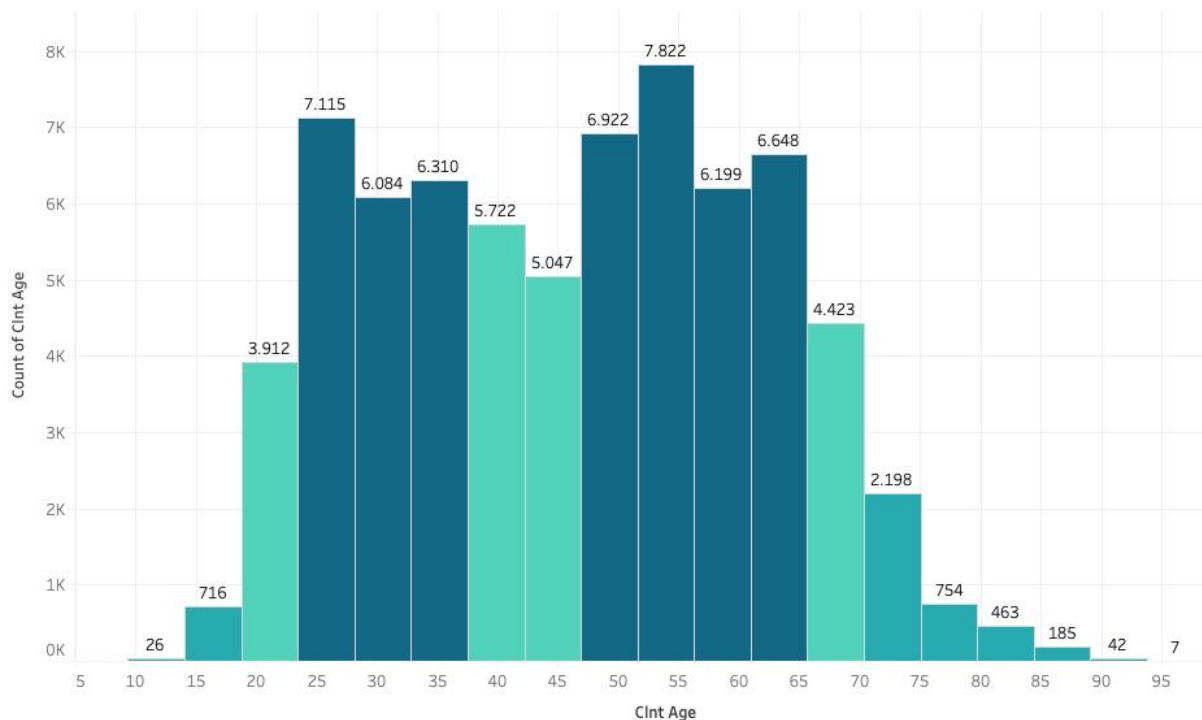 - One file with 412.264 rows and 5 columns

- **Groups for the test:**

  A detail of the ID customer that belongs to the group that tests the new changes ("Test") and the ones that do not ("Control")

  - One file with 70.609 rows and 2 columns, then after become 50.500 rows after cleaning

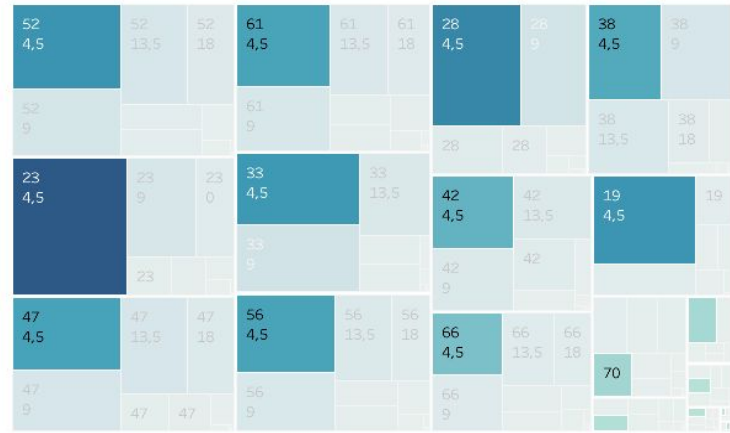# Exploratory Data Analysis (EDA)
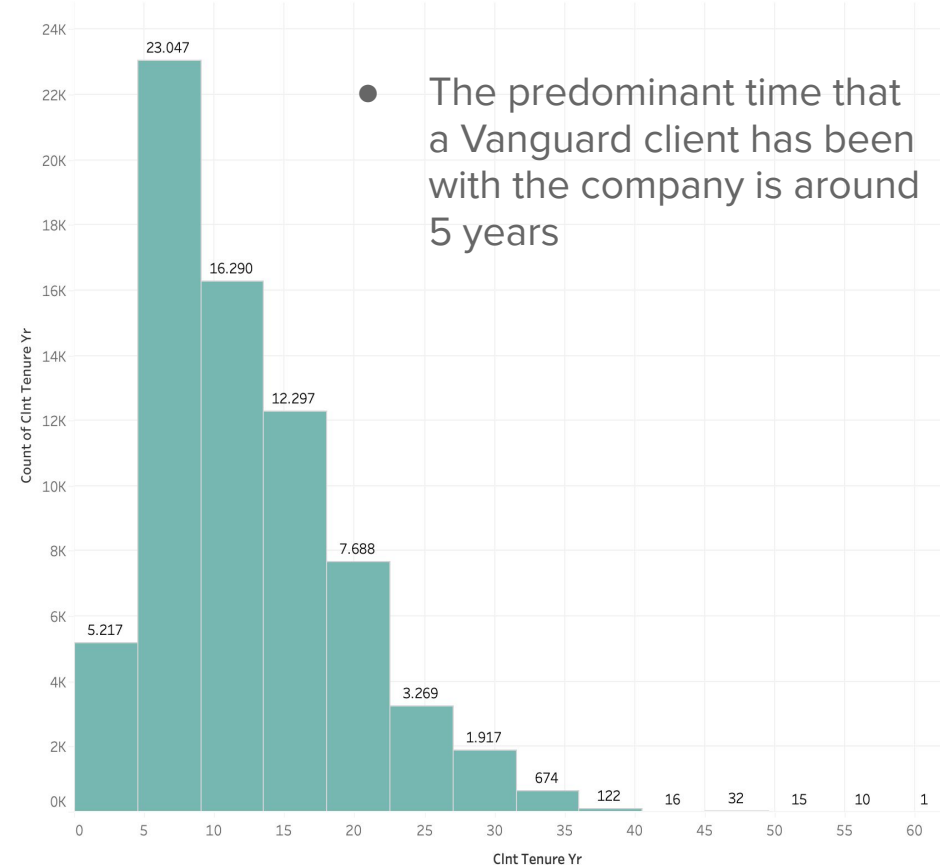
Number of clients by Age

- Vanguard has three distinct cluster of clients by age

- The diversity of age ranges among clients may lead to misinterpretations in calculations based on the average age
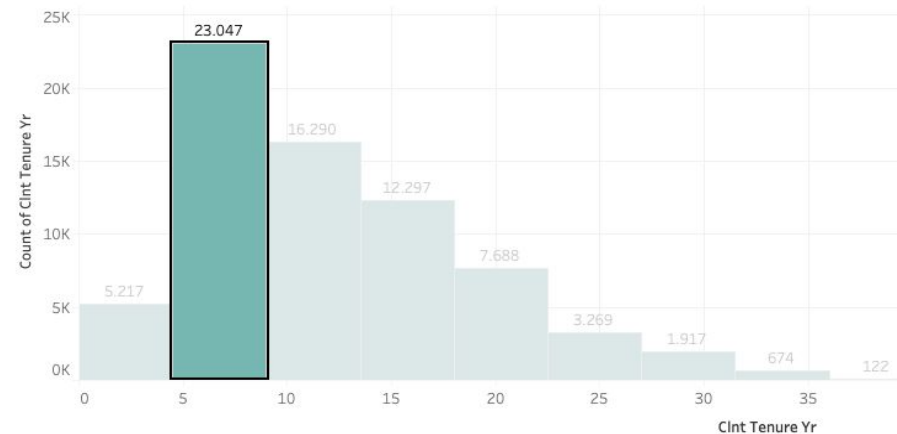
Number of Tenure Yr by Age

Exploratory Data Analysis (EDA)

Number of clients by Tenure Yr

- The predominant time that a Vanguard client has been with the company is around 5 years
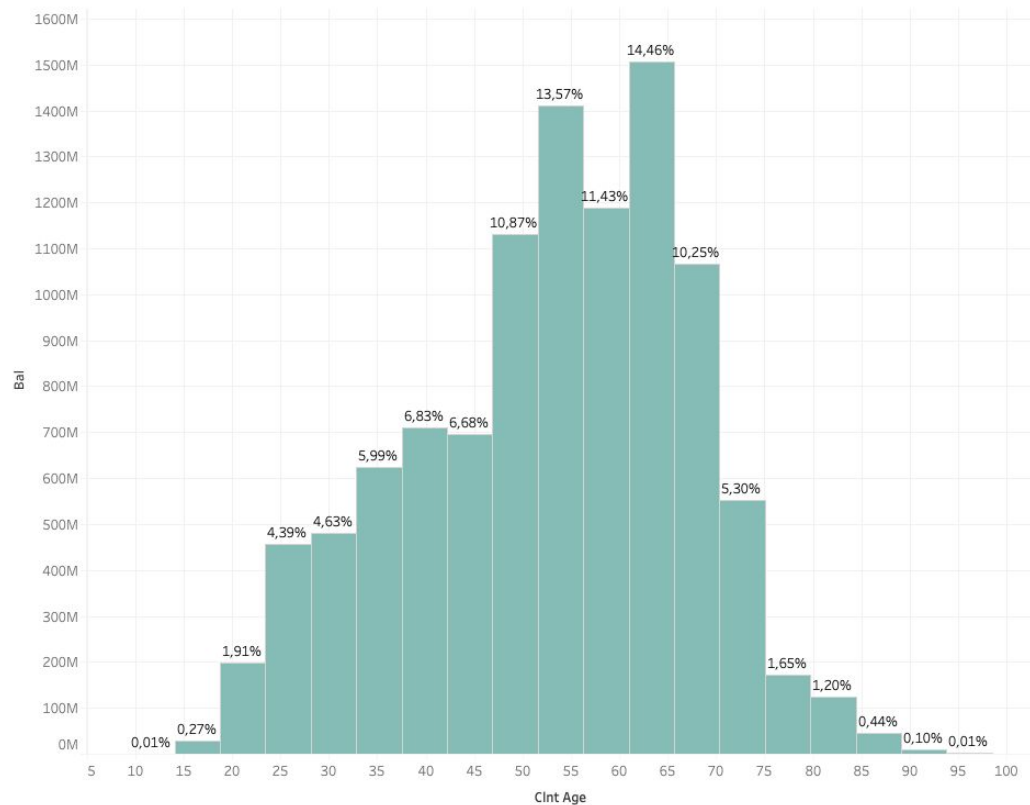
Number of clients by Tenure Yr

Exploratory Data Analysis (EDA)

Balance of the acount by client's age

- As Vanguard is an investment company it is important to mention that though the percentage in the balance account of the customer is quite spread between the different ages. The highest percentages are around the ages of fifty and sixtyish

Exploratory Data Analysis (EDA)

In summary, from the profiles of customers, we can mention that there is a wide range of ages and duration of being a customer but:

- The main client at the moment that the data was collected are the ones around the age of 50 and 65 years old. Having a bigger balance and also having the most amount of clients (28k).

- There is also a significant amount of younger clients (20k) between the ages of 28 and 35 years old. They have been with the company for a high amount of time, around 5 years.

Performance Metrics

The KPIs calculated for measuring the new design:

- Completion rate and improvement in the total time
- Time Spent on each step: *Start, Step 1, Step 2, Step 3 and Confirm*
- Errors and fails in reaching last step
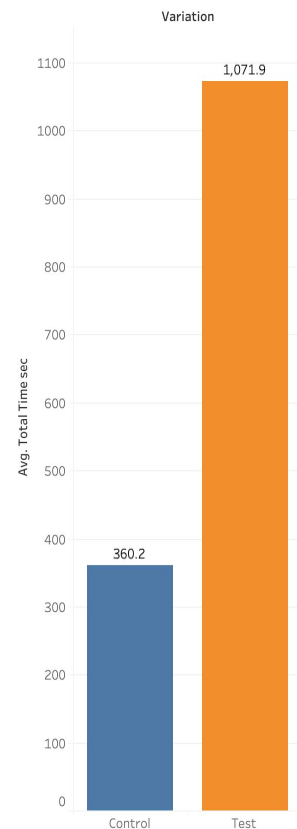- Completion by main clients

Note: This KPI was calculated with a sample of 50.500 clients
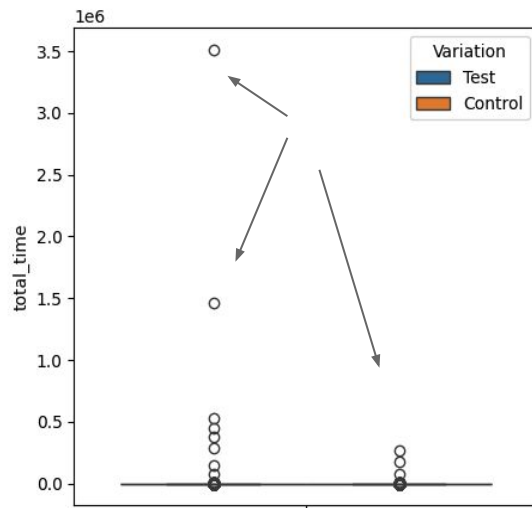
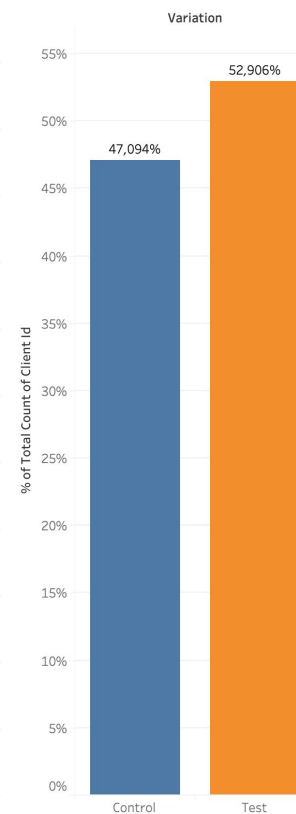# Completion Rate and improvement in time avg

Completion Rate
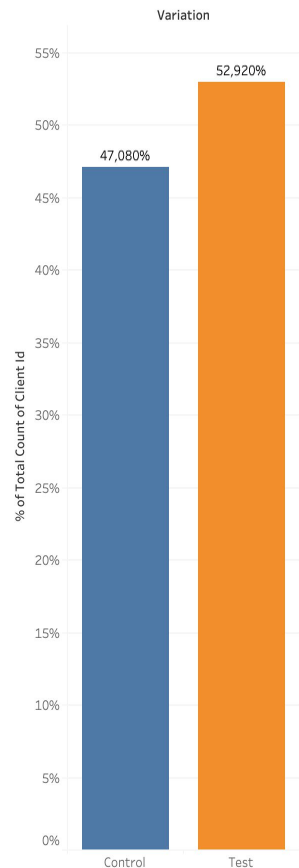
AVG Total time in seconds by group

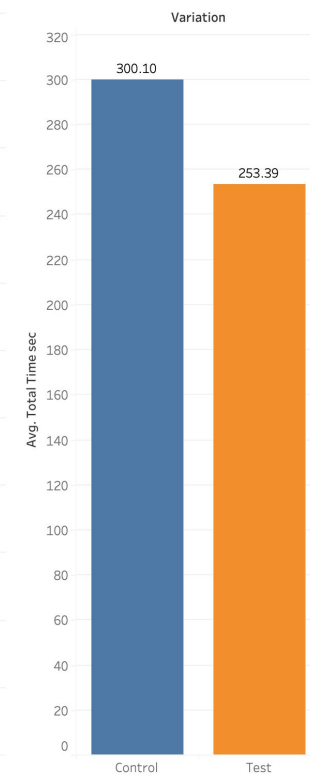

The test group has a higher completion rate than the control group. After removing the outliers the average time was also improved in the test group

Completion Rate without outliers

AVG Total time in seconds by group without outliers

Time spend on each step

Time for each step

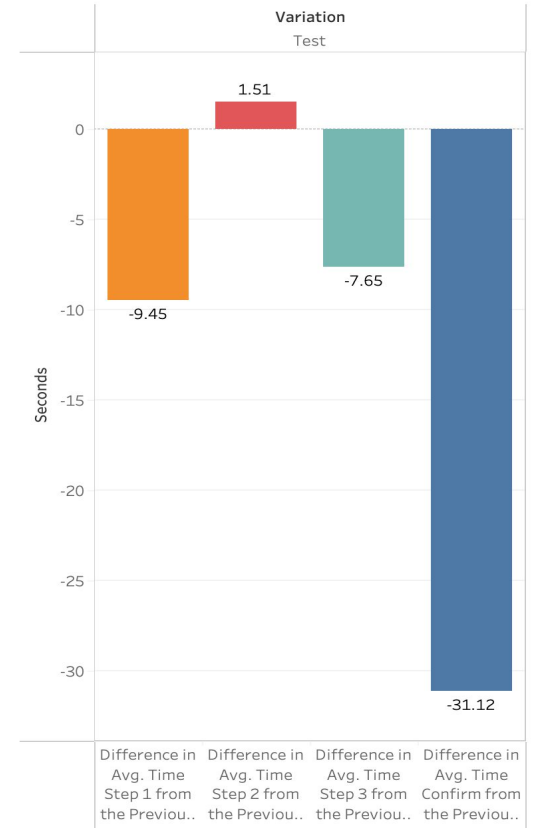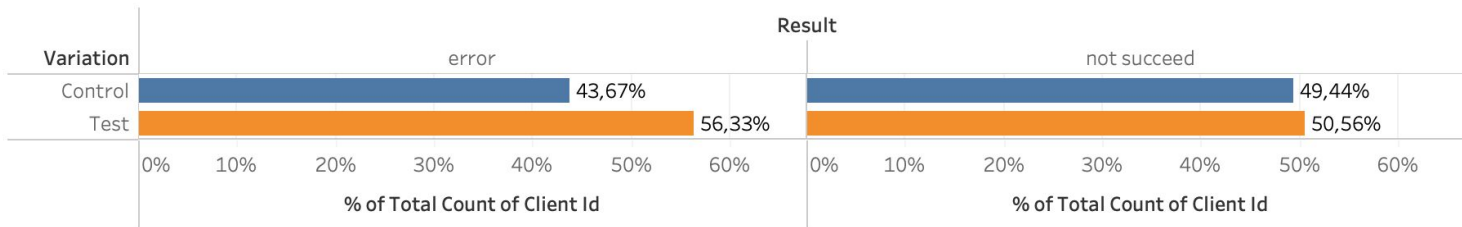## Difference on time between control and test groups
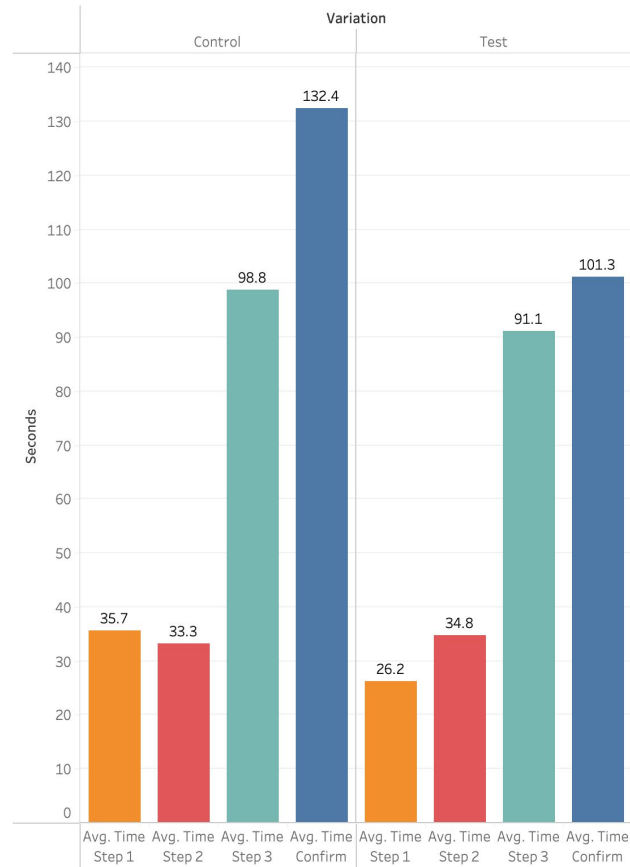
There was indeed a diminution in the average of seconds by each step (except from step 1 to step 2). The big difference was around 1 minute less from the step 3 to confirm

Errors and failures reaching the last step

Amount of Errors

Variation	error		not succeed	
Control	43,67%		49,44%	
Test	56,33%		50,56%	

Result

% of Total Count of Client Id

% of Total Count of Client Id

Amount of trials by step

Result / Variation / Mode — error — Control — Test

Count of Client Id

Control: confirm 6.319, start 673, step_1 997, step_2 1, step_3 85
Test: confirm 9.882, start 230, step_1 288, step_2 1, step_3 14
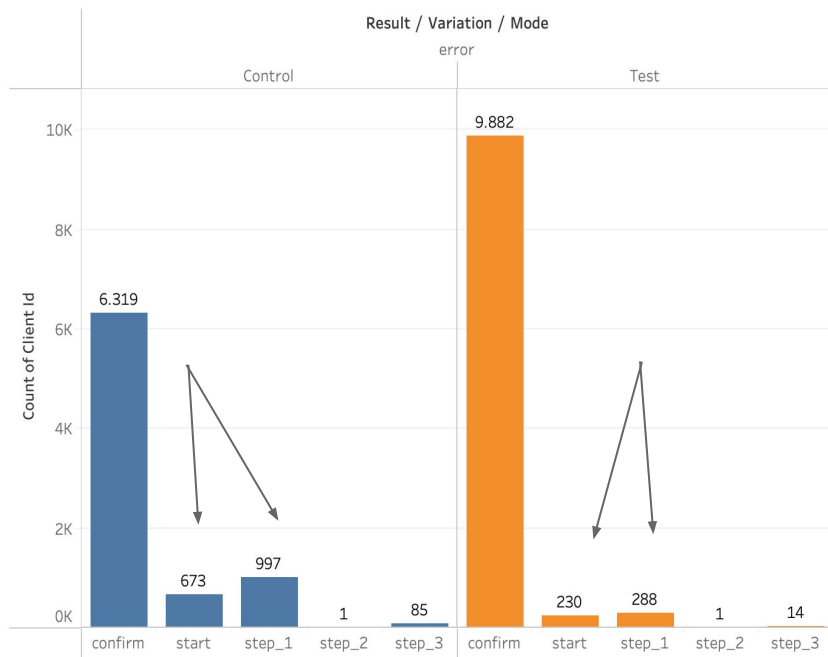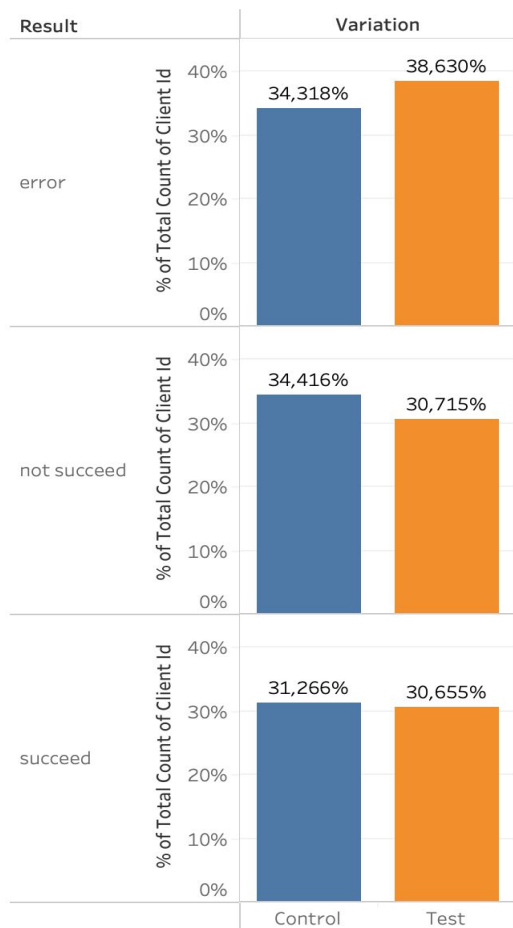
The difference between the two groups of clients who do not succeed in reaching "confirm" is less than 1% against the clients in both groups that in the end reach the "confirm" steps but not without coming back to any step before.

Here we can also notice that Start and Step_1 are the steps that clients in both groups enhance more. Perhaps is an error or a bug that the new design is improving because the frequency for the test group was at least less

Total Percentage

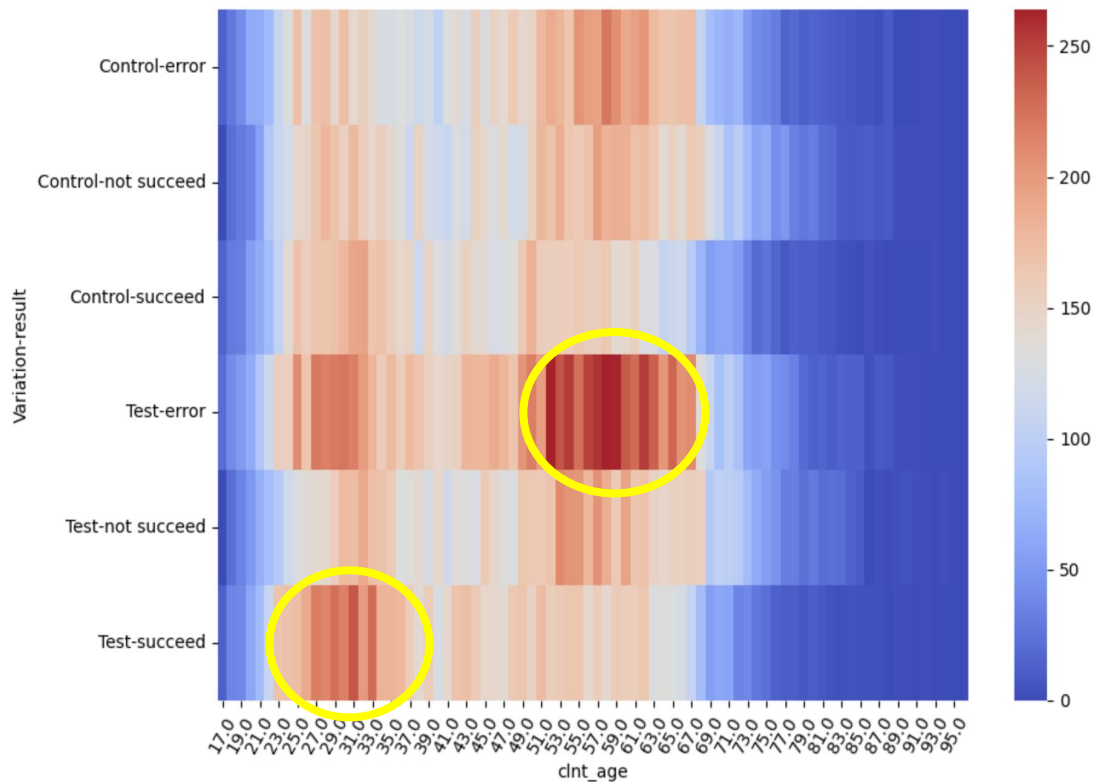| Result	Variation	
	Control	Test
error	34,318%	38,630%
not succeed	34,416%	30,715%
succeed	31,266%	30,655%

Total Percentages by the two groups

Even though the Test group has a completion rate higher than the Control group. The Control group in comparison with the number of clients, has a higher rate of success of 31,3%

Completion by main clients

Clients between 50 and 65 years old, reach the "confirm" step but with errors.

Rather than the clients between the ages of 25 and 33 who succeed.

Hypothesis Testing

For this A/B test the following hypothesis tests were conducted:

|	
Completion Rate: Z-Test: Completion rate Control = Completion rate Test Completion rate Control ≠ Completion rate Test	**Result:** With a P.value of 0,14, higher than the alpha 0,05 The null is not rejected. Therefore there is not a significant difference between the completion rate between the two groups
Completion Rate with cost-effectiveness: Z-Test: Difference < 5% of threshold Difference > 5% of threshold	**Result:** With a P.value of 0,93, higher than the alpha 0,05 The null is not rejected. Therefore from a point of cost perspective is not justified to implement the new design
Age independency: Chi2 Test: Results are independent of the age Results are dependant of the age	**Result:** With a P.value of 0,0, less than the alpha 0,05 The null hypothesis is rejected. Therefore those variables have an association. But for the result of the Cramer's of 0,07 that association is weak
Age has a correlation with avg time for the total process: Pearson Test: Age do not have a correlation with the Total average Age do have a correlation with the Total average	**Result:** With a P.value of 0,0, less than the alpha 0,05 The null hypothesis is rejected. The age does not have a linear relation with the Total time from the test and with the Spearman method 0,266 there is a weak or not monotonic relationship

Hypothesis Testing
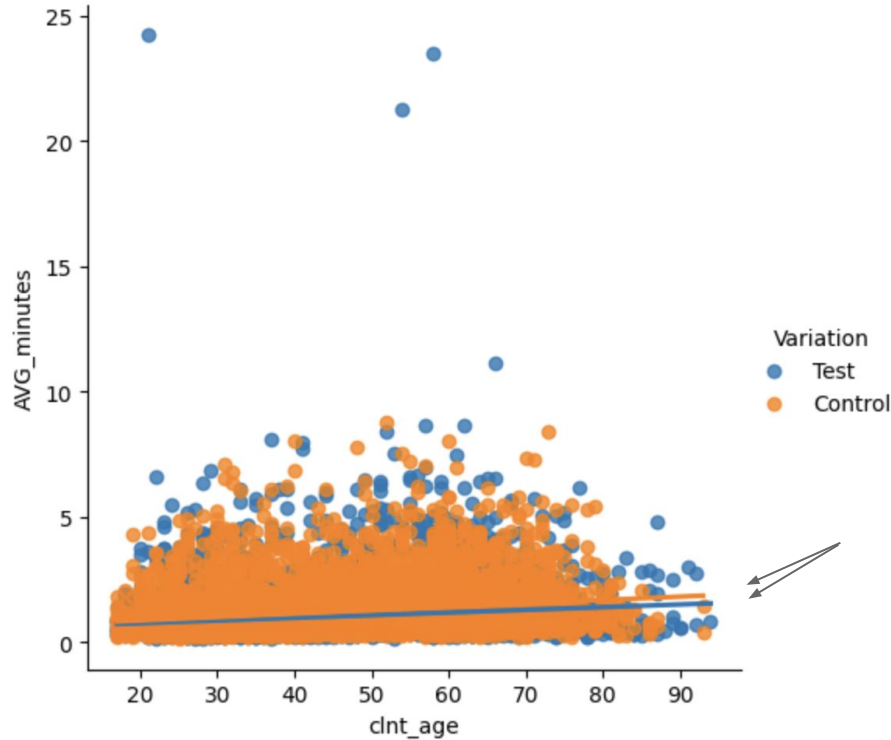
For the age and the AVG total time, we can see that being younger does not guarantee that the average in minutes will be less

Experiment Evaluation
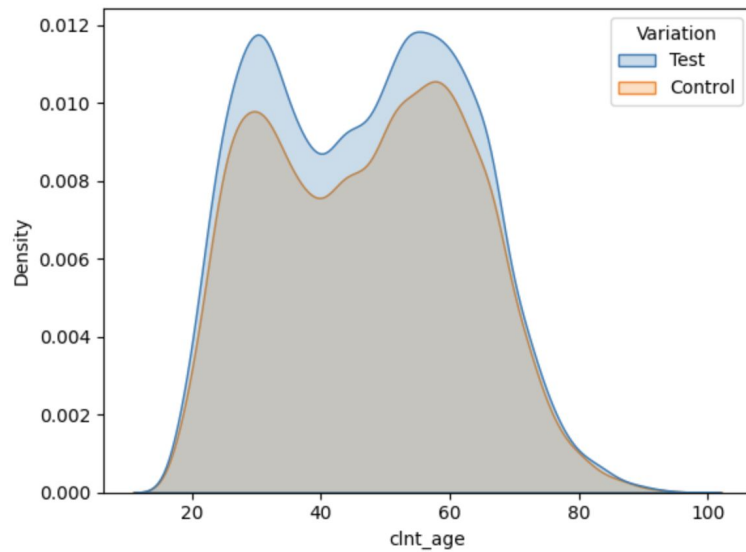
- The Test sample was higher than the Control test but it matched the cluster that we see from the total profile of Vanguard's customers
- It happens also for the Tenure years
- From the data, at the same time, 22,137 clients were not part of the test but succeeded in reaching "confirm". A higher amount of the total customers who succeed in both groups
- The sample was enough to conduct the statistical test
- The null values from the data were minimal, to affect the results
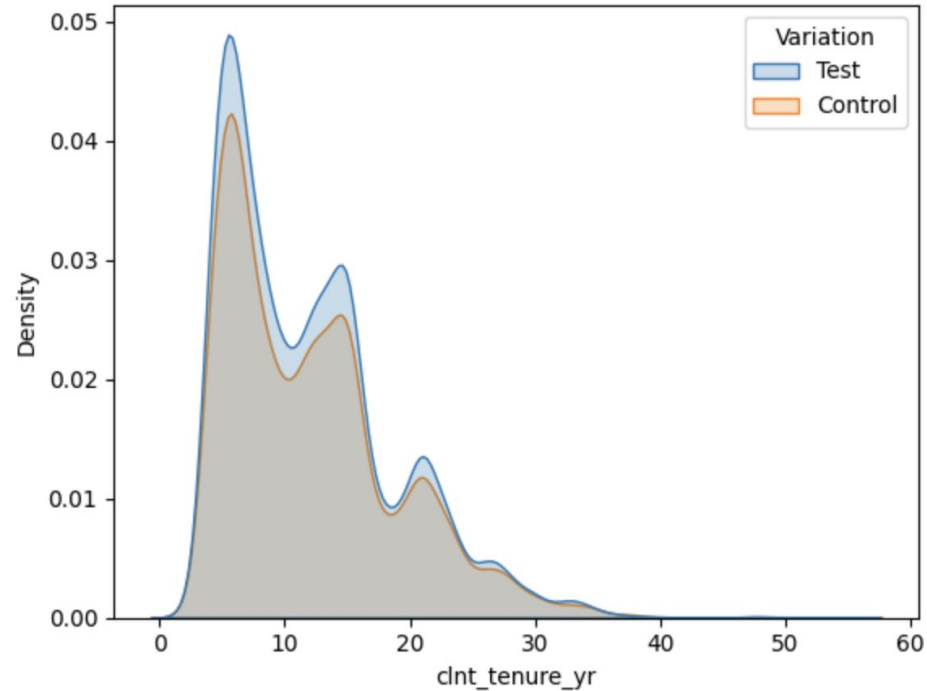
Conclusions

- Implementing the changes would not follow a huge improvement from the client's point of view, and could be no cost-efficient for the company.

- The test highlighted some bugs that can be checked but the IT team, as to why some customers took more than 1 day to complete the test and why others could event not reach the "confirm" step.

- The company might better improve the UI based on the main customers which are people around 50 and 65 years. Or perhaps create an option where the customer wants to apply the new design or not when he/she is interacting online.

Thanks!