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*Business Analysis Case Study*

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# Business Analysis Case Study



## Subject

- The data is related with direct marketing campaigns of a Portuguese banking institution.
- The marketing campaigns were based on phone calls.
- Often, more than one contact to the same client was required, in order to access if the product (bank term deposit) would be ('yes') or not ('no') subscribed.

A term deposit is a fixed-term investment that includes the deposit of money into an account at a financial institution.



## Objectives

- Figure out which factors lead to “Subscription” and give recommendations for future campaigns and attract more potential participants!



## Data Used

- File: bank-full.csv, bank-additional-full.csv
- Source:  
<http://archive.ics.uci.edu/ml/datasets/Bank+Marketing#>
- Period covered: from May 2008 to November 2010
- Samples used: 86,399 (45,211 +41,188)
- Attributes used: 12



## Input variables: X

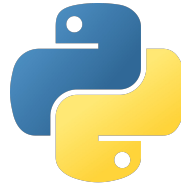
<b>1. Age</b> (numeric)	<b>2. Marital</b> (categorical): marital status	<b>3. Job</b> (categorical): type of job	<b>4. Education</b> (categorical)
<b>5. Housing, Loan</b> (categorical): Has housing loan? Has personal loan?	<b>6. Contact</b> (categorical): contact communication type	<b>7. Month</b> (categorical): last contact month of year	<b>8. Duration</b> (numeric): last contact duration, in seconds
<b>9. Previous Contact</b> (numeric): number of contacts performed before this campaign and for this client		<b>10. Previous Outcome</b> (categorical): outcome of the previous marketing campaign	

**Out variables: Y = Subscription / No subscription** (binary)



## Method

- 1. Created index for each sample in **Numbers**.
- 2. Combined 2 datasets in **BigQuery**.
- 3. Calculate the correlation coefficients between Duration and Result (Y) in **Python**.
- 4. Drew the graphs in **Tableau Public** to find out which attributes lead to higher possibility of Yes.

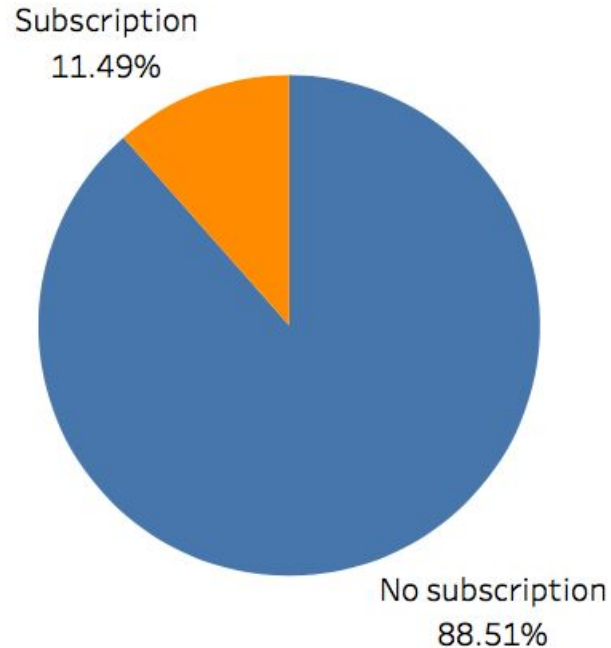


+tableau++public



## Analysis & Findings (Y = Subscription / No subscription)

**"In average,** 11.49% will subscribe  
(yes) a term deposit."

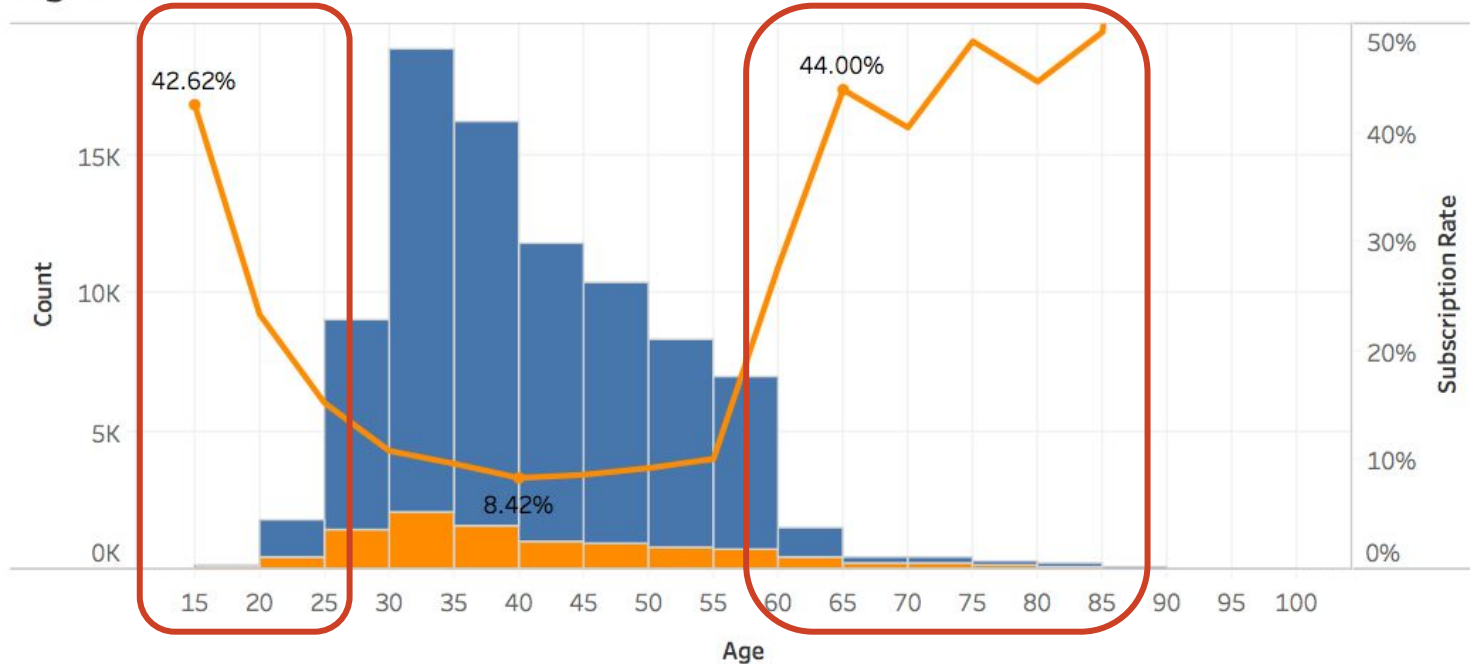


## Bank client data:

### 1. Analysis & Findings (Age)

“It is more likely for people **below 25**  
**or above 60** to subscribe!”

Age Distribution





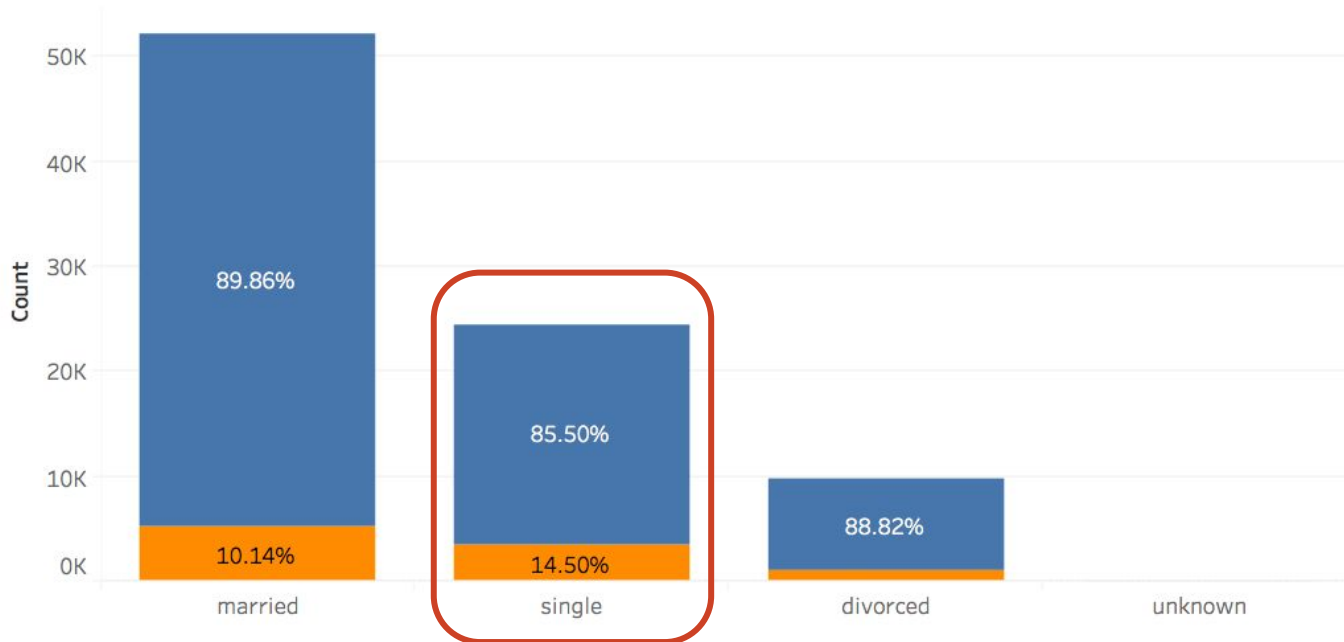
## Bank client data:

2.

### Analysis & Findings (Marital)

“Single people is more likely to subscribe!”

Marital

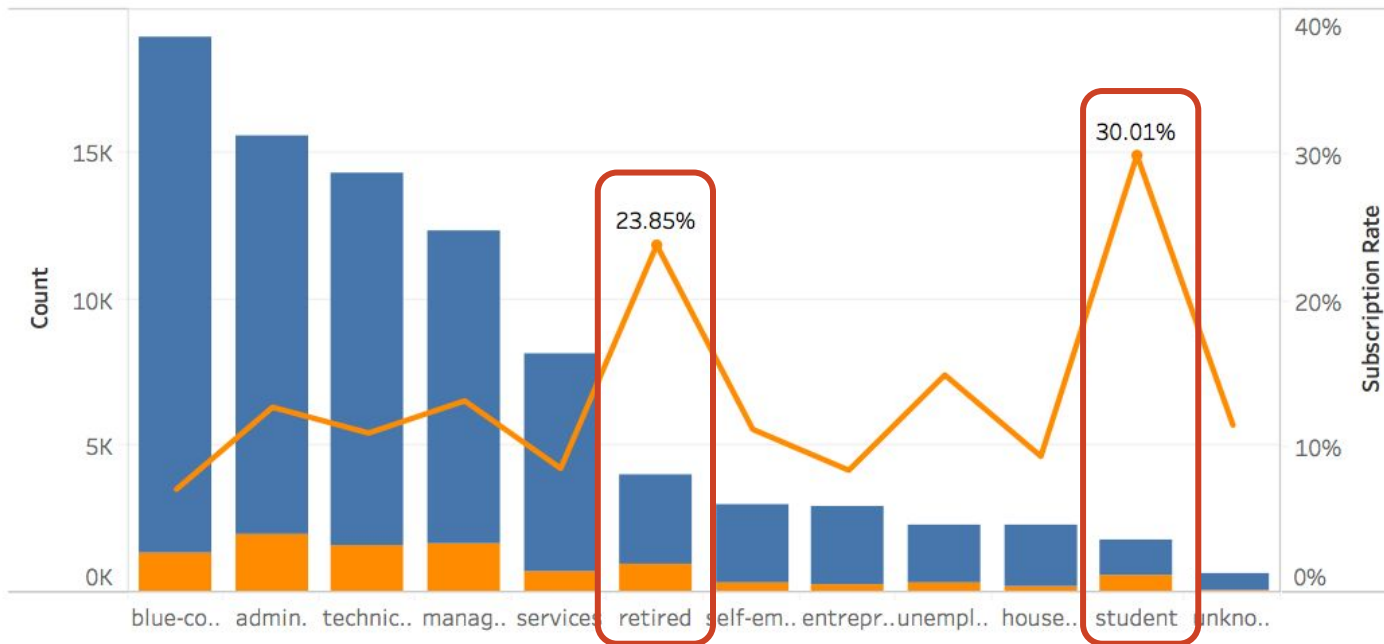


3.

## Bank client data: Analysis & Findings (Job)

“It is more likely for retired people or student to subscribe!”

Job

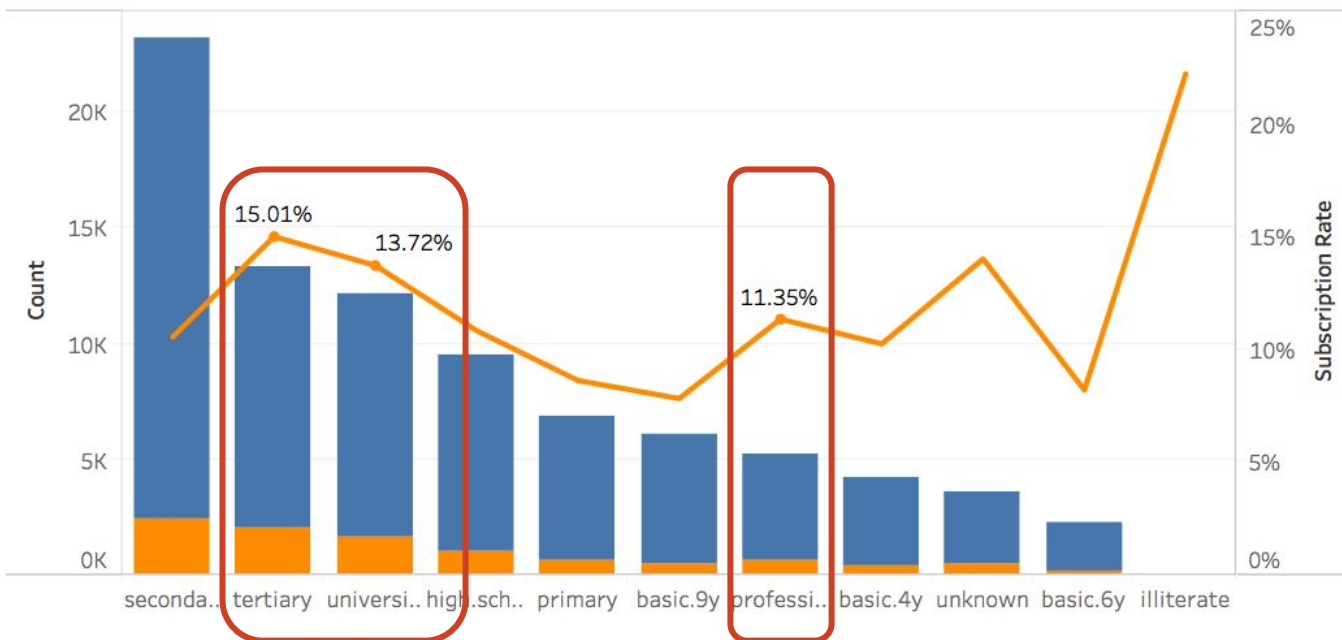


4.

## Bank client data: Analysis & Findings (Education)

“It is **slightly** more likely for tertiary, university degree, professional course to subscribe!”

Education



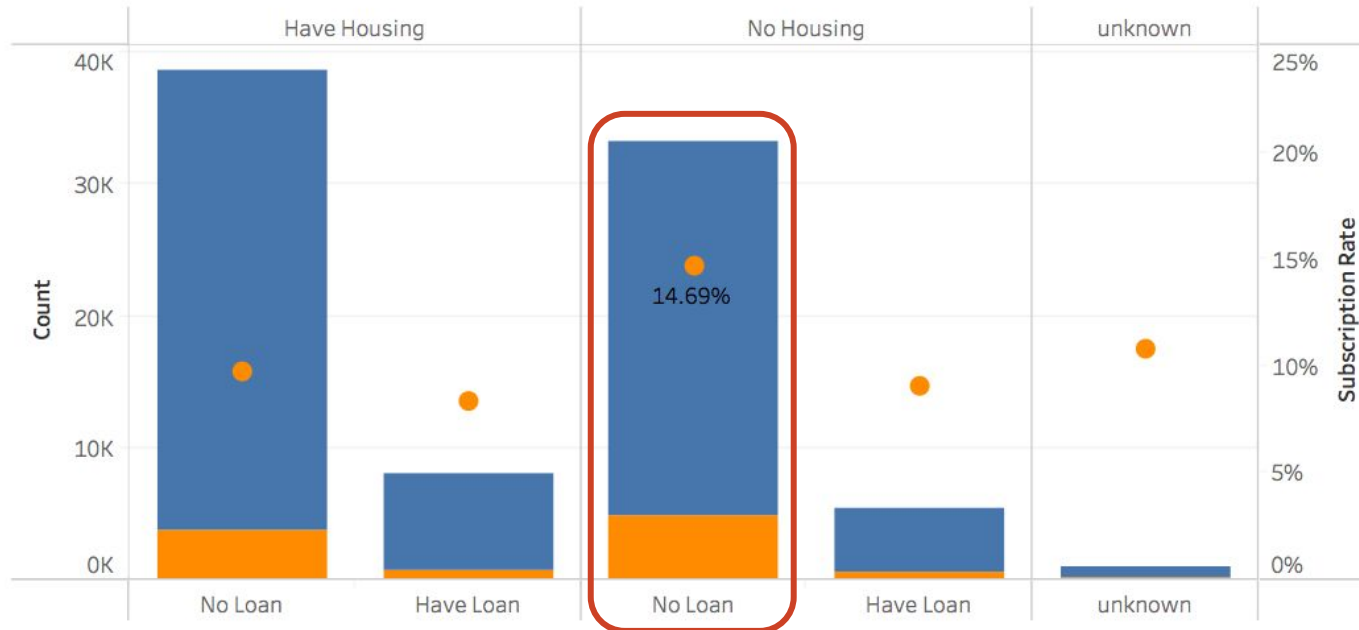
## Bank client data:

5.

### Analysis & Findings (Housing, Loan)

“It is more likely for people who don't have housing or loan to subscribe!”

#### Housing, Loan



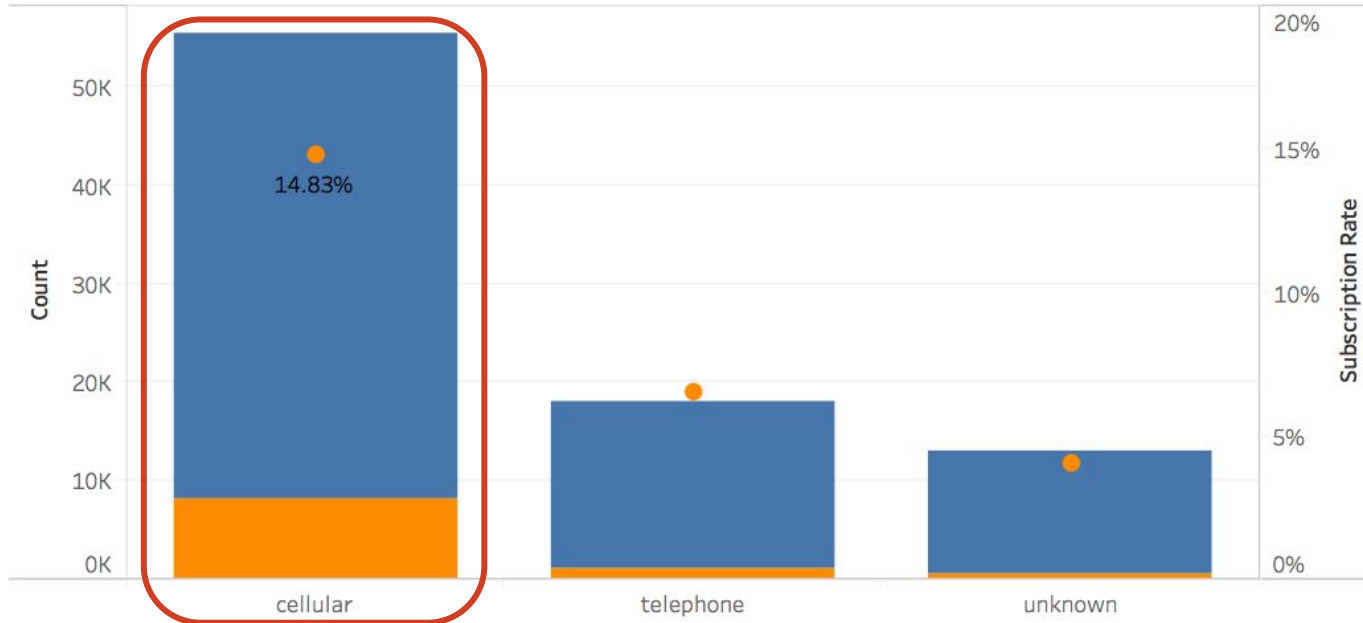
Last contact:

6.

## Analysis & Findings (Contact)

“The subscribe rate is higher if you contact **by cellular!**”

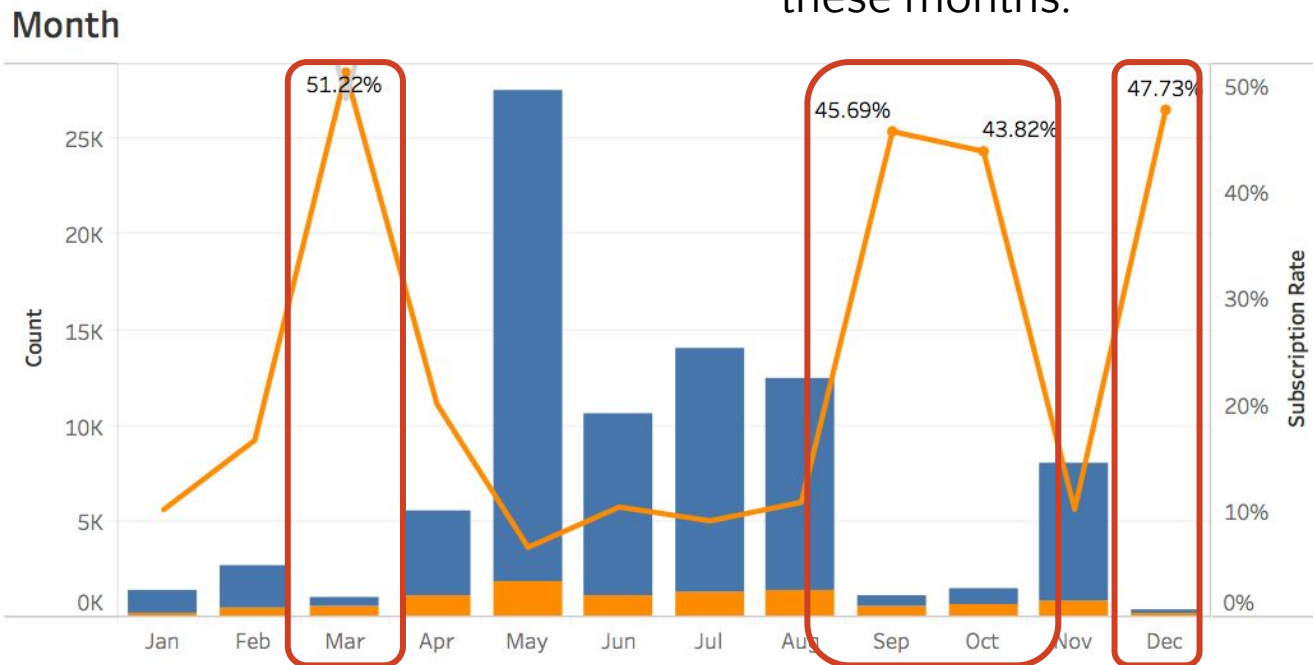
Contact



7.

## Last contact: Analysis & Findings (Month)

“There are fewer samples in March, September, October and December. However, their subscription rates are very high! Need more investigation in these months.”

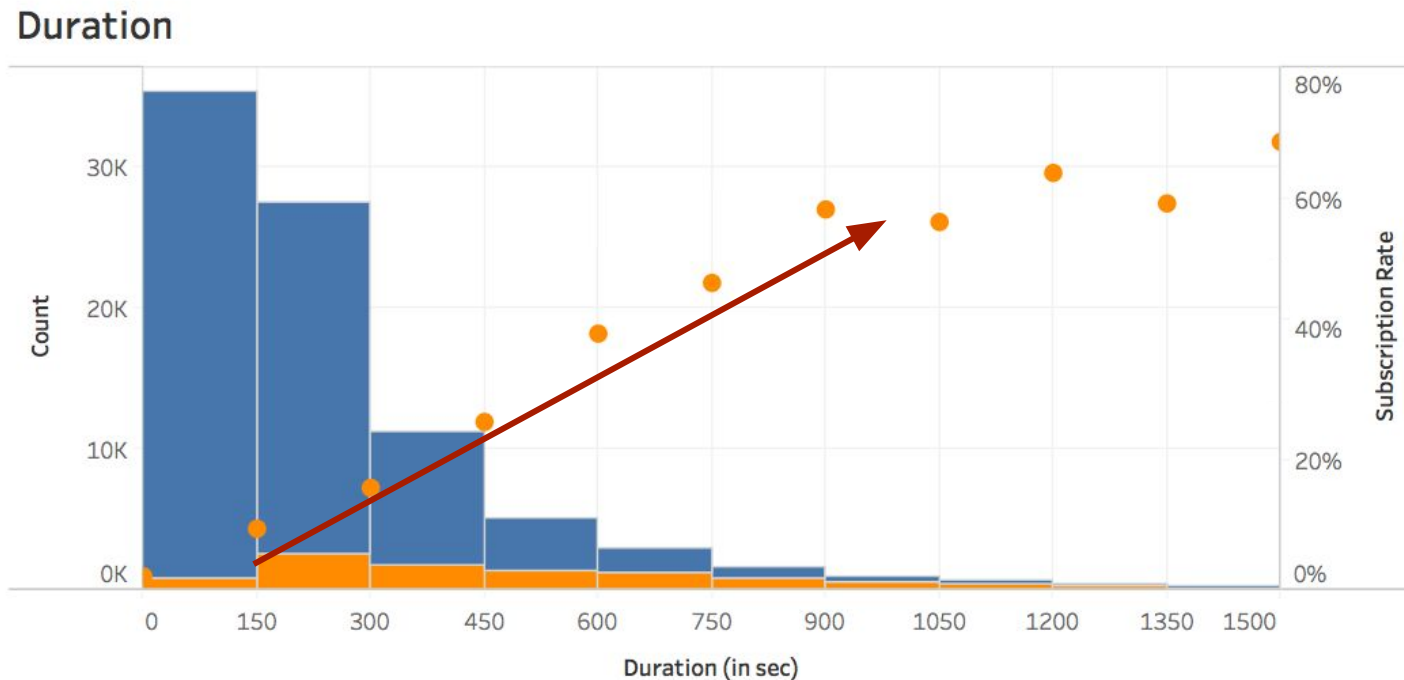


8.

## Last contact: Analysis & Findings (Duration)

“It is easy to see that longer duration of the contact, better subscription rate.”

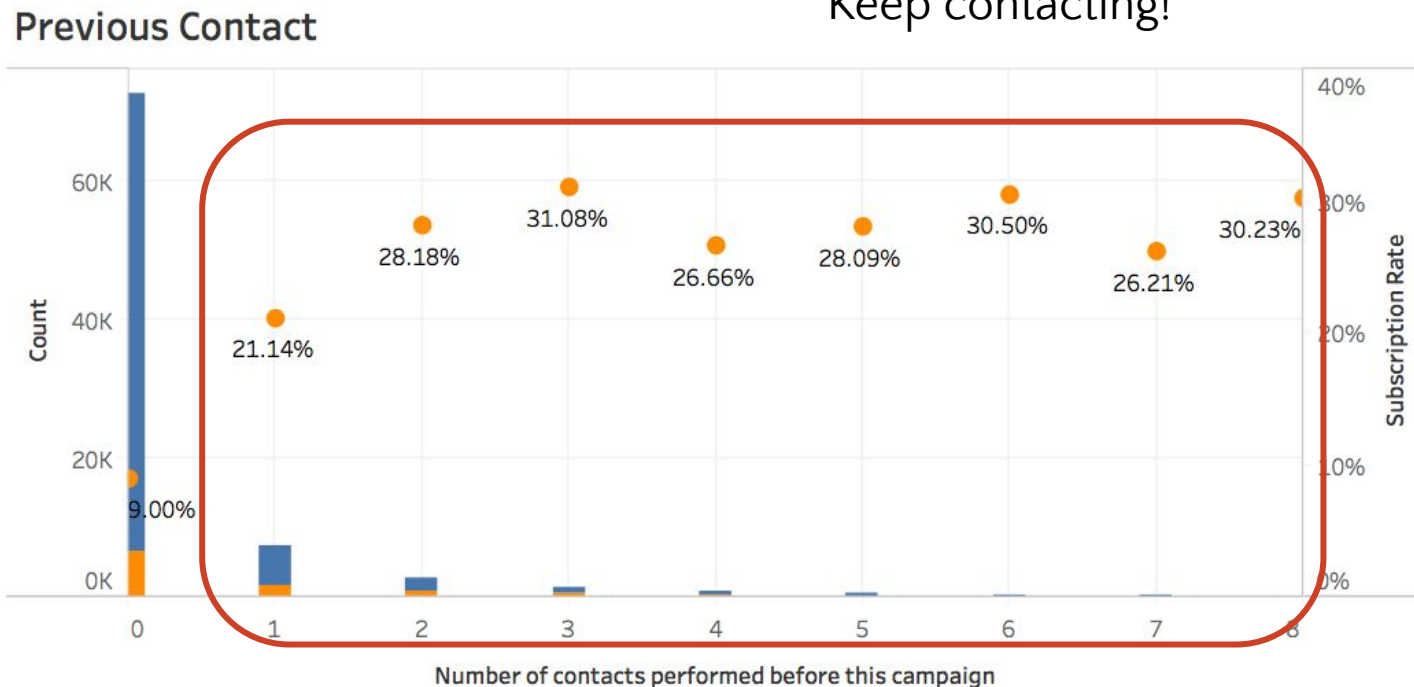
Correlation coefficients: 0.4



9.

## Before the campaign: Analysis & Findings (Previous Contact)

“Except 0 contact performed before the campaign has low subscription rate, 1 or more contacts are all high. Keep contacting!”



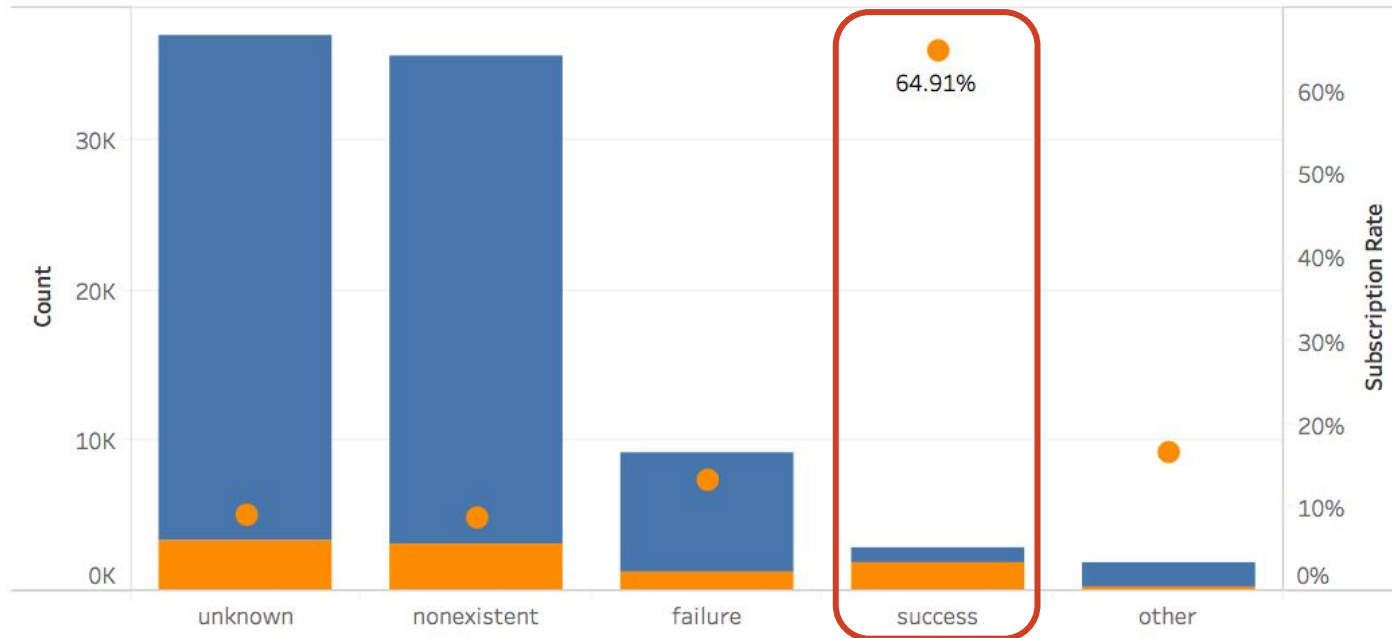


10.

## Before the campaign: Analysis & Findings (Previous Outcome)

“If the previous outcome was **successful**, the subscription rate is as high as 64.91%!”

Previous Outcome





## Recommendations

- **Bank client data:** Launch campaigns focus on people with these characteristics: Young, Retired, Still studying, Higher Education, Single, No Housing or Loan.
- **Last contact:** Contact them via mobile, especially in March, September, October, December. And try to longer the conversation.
- **Before the campaign:** Keeping the old successful clients is the must but still try to contact again.



# Thanks!

*Any questions ?*