Easy Report – Sales-Marketing-Business Dev Ecommerce Dashboard

1. Background

   As a new BI Analyst at a new founded ecommerce company, we're analyze to be a part of successful operations, the company need to monitor their entire activity. There are plenty of rich data in internal system consist of sales data (sales actual data, customer and seller data, review data etc), marketing data (promotion and campaign data, profile customer data) and business development data (ab testing data). So, we're proposed a comprehensive dashboard to C-level and each team member in sales, marketing and business development.

2. Objectives
   i) Vision

      Providing organizations with the power to know with data visualization. Make the lives of our CEO, Sales and Marketing and BD team better through providing an insightful data

   ii) Goals

      We're setting up our goals based on each team and functions:

      - Sales: Providing information related to sales and operations performance such as order, profit, review and seller information
      - Marketing: Segmenting user and determining the effectiveness of marketing and retention of customer
      - Business Development: Determining which version of landing page is better based on A/B testing

   iii) Initiatives

      Creating a Dashboard to monitor and improve sales, marketing and business development based on each team goals. So, our teams can see their performance.

   iv) Personas

      - High Managerial Level for Quick update and actions
      - Sales and Operational Team: to drill down and investigate sales
      - Marketing Team: to see and analyze effectiveness of marketing and retention
      - Business Development Team: to get a conclusion for landing pages based on data

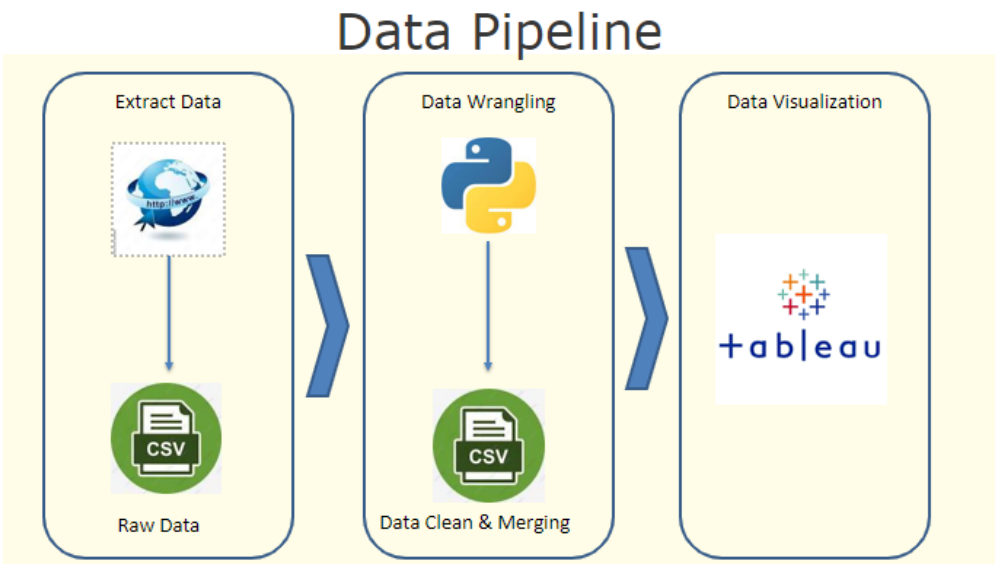
   v) Features

      Features included in the release:

      - About Us: Will show you the dashboard homepage and overall status for every key matrix
      - Sales Overview: Will show you the sales general information from total sales, total order growth size etc

- Sales Review: Will show you the information of review segment, in general it will show customer feedback and proportions
- Sales for Seller: Will show you the overall seller performance and and rank for seller
- Marketing dashboard: Will show RFM analysis and also cohort analysis to see our customer engagement
- AB Testing: Will show the result of AB testing and suggestion for next action based on data

3. Overview dan Process:
    a. Process

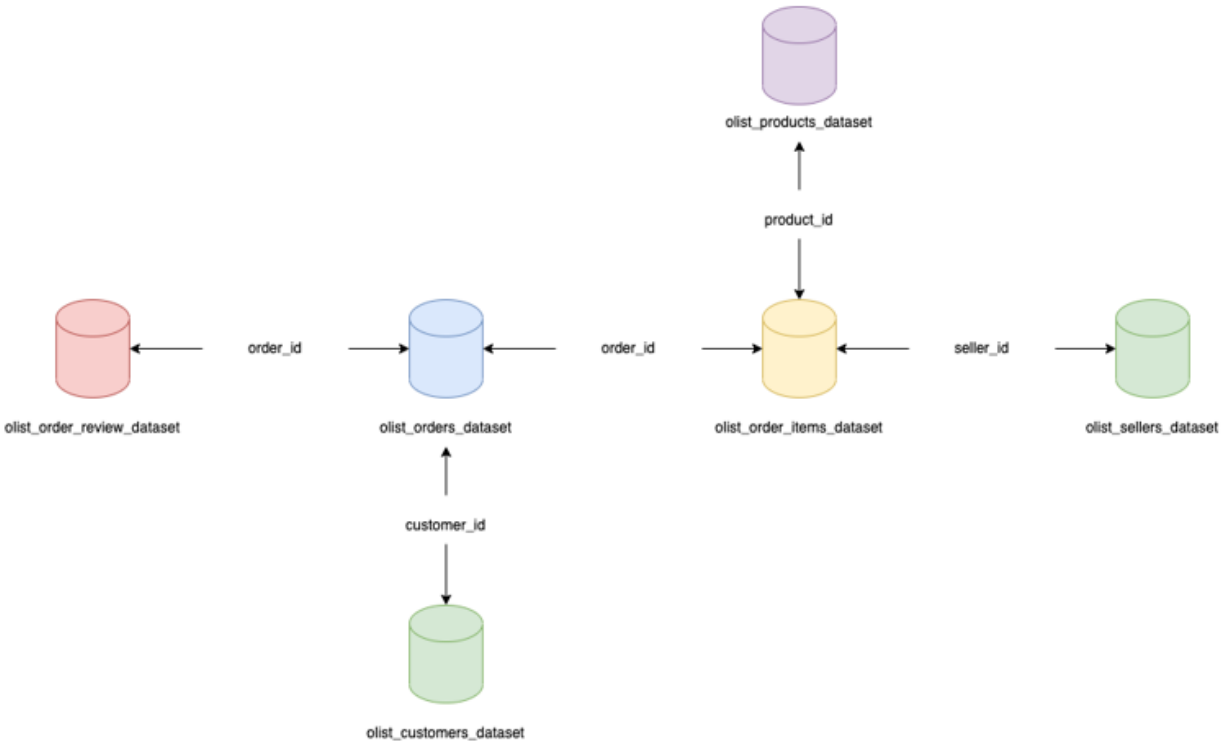


i. Extracting the data

On this case, because of we're using an extracting data sample so first is downloading the data from their data source. But in the future, it's better if we're connecting the data pipeline from ERP – Database (SQL) and put it in python to analyze.

Data is having several information to analyze the data. Below is list of data to create a comprehensive dashboard as we're sharing in previous section.

1. Sales Data:
    a. Order list dataset
    b. Order item dataset
    c. Order review dataset
    d. Order customer dataset
    e. Order seller dataset
    f. Order product dataset



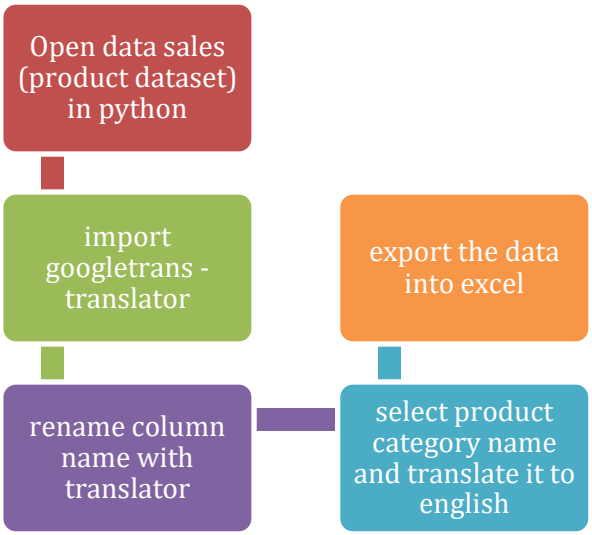
2. Marketing data
3. BD Data – AB testing data

ii. Data Cleaning and Data processing

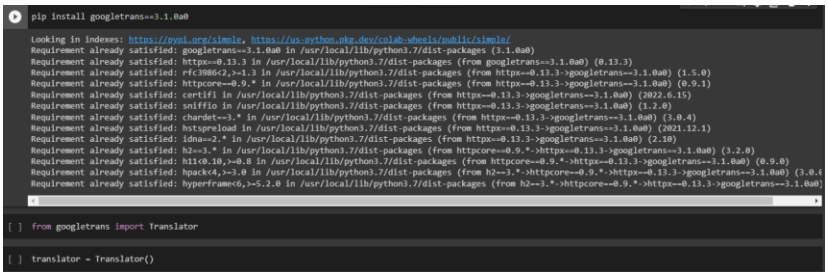
After the data collected, data marketing is ready to use on tableau. While data sales need some cleaning and data AB testing need to analyze more in python script.

1. Data Cleaning – Sales Product

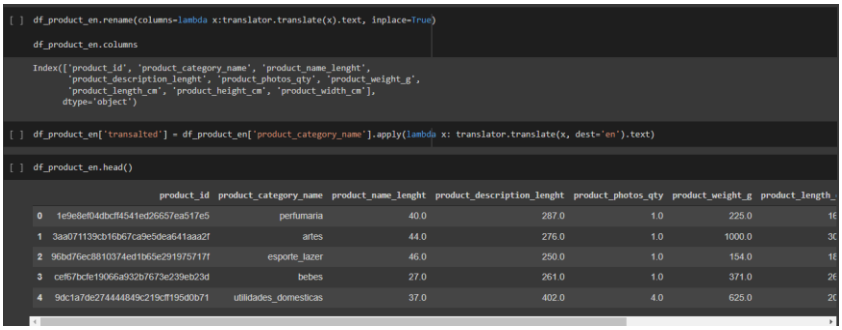
   Data here is quite straightforward, the data is clean enough and we need to do cleaning on 2 parts, translating the product name and also mapping state name into province name.



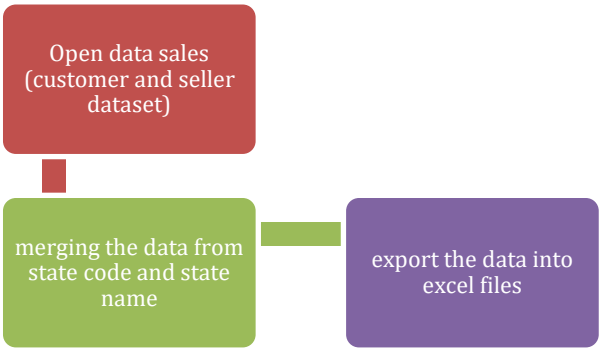
a. Use google trans==3.1.0a0 dan import Translator



b. Translate column name and data in product category name

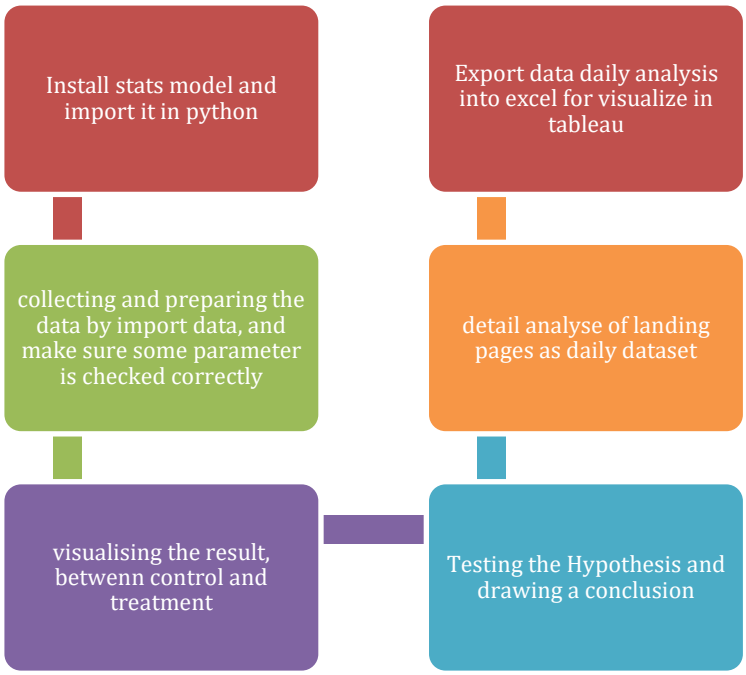


2. Data Cleaning – Regional mapping
   Currently the data is not referencing a right area, so we need to search from internet and mapping those state code into state name



3. Data wrangling - AB testing

   AB testing test will be done in python completely and the result will be simulated in tableau part.

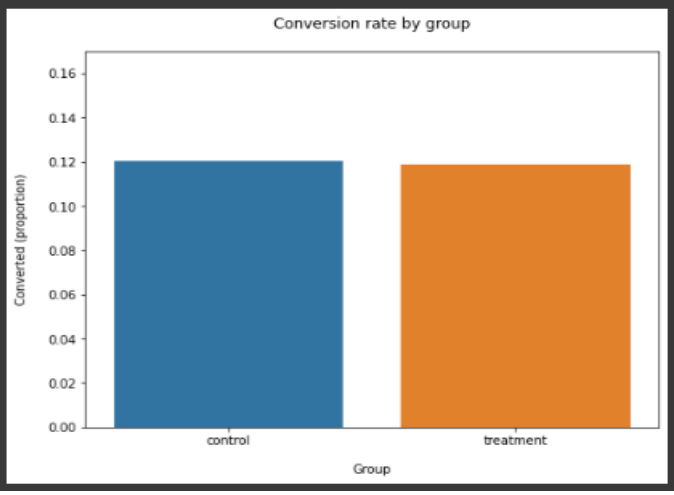


   a. Visualizing result, To calculate some basic statistics to get an idea of what our samples look like.

```
# To calculate some basic statistics to get an idea of what our samples look like.
conversion_rates = day_all.groupby('group')['converted']

std_p = lambda x: np.std(x, ddof=0)              # Std. deviation of the proportion
se_p = lambda x: stats.sem(x, ddof=0)            # Std. error of the proportion (std / sqrt(n))

conversion_rates = conversion_rates.agg([np.mean, std_p, se_p])
conversion_rates.columns = ['conversion_rate', 'std_deviation', 'std_error']


conversion_rates.style.format('{:.3f}')
```

group	conversion_rate	std_deviation	std_error
control	0.120	0.325	0.001
treatment	0.119	0.323	0.001

```
# To Plotting the data will make these results easier to grasp
plt.figure(figsize=(8,6))

sns.barplot(x=day_all['group'], y=day_all['converted'], ci=False)

plt.ylim(0, 0.17)
plt.title('Conversion rate by group', pad=20)
plt.xlabel('Group', labelpad=15)
plt.ylabel('Converted (proportion)', labelpad=15);
```



b. Testing the hypothesis and drawing conclusions, To calculate -value (i.e. z-test) using normal approximation with very large sample.

```
[ ] # To calculate -value (i.e. z-test) using normal approximation with very large sample
    control_results = day_all[day_all['group'] == 'control']['converted']
    treatment_results = day_all[day_all['group'] == 'treatment']['converted']

    n_con = control_results.count()
    n_treat = treatment_results.count()
    successes = [control_results.sum(), treatment_results.sum()]
    nobs = [n_con, n_treat]

    z_stat, pval = proportions_ztest(successes, nobs=nobs)
    (lower_con, lower_treat), (upper_con, upper_treat) = proportion_confint(successes, nobs=nobs, alpha=0.05)

    print(f'z statistic: {z_stat:.2f}')
    print(f'p-value: {pval:.3f}')
    print(f'ci 95% for control group: [{lower_con:.3f}, {upper_con:.3f}]')
    print(f'ci 95% for treatment group: [{lower_treat:.3f}, {upper_treat:.3f}]')
```

```
z statistic: 1.19
p-value: 0.232
ci 95% for control group: [0.118, 0.122]
ci 95% for treatment group: [0.117, 0.120]
```

c. Daily dataset analysis, actually almost same process as previous process but we're analyzing the data in daily basis

```
# To calculate some basic statistics to get an idea of what our samples look like.
conversion_rates = day01.groupby('group')['converted']

std_p = lambda x: np.std(x, ddof=0)              # Std. deviation of the proportion
se_p = lambda x: stats.sem(x, ddof=0)            # Std. error of the proportion (std / sqrt(n))

conversion_rates = conversion_rates.agg([np.mean, std_p, se_p])
conversion_rates.columns = ['conversion_rate', 'std_deviation', 'std_error']


conversion_rates.style.format('{:.3f}')
```

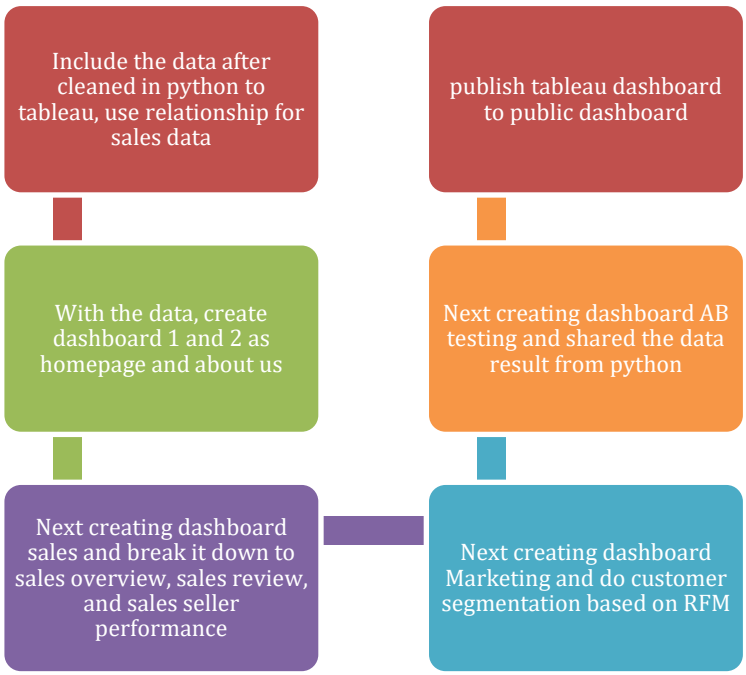
group	conversion_rate	std_deviation	std_error
control	0.125	0.331	0.006
treatment	0.120	0.325	0.006

```
# To calculate -value (i.e. z-test) using normal approximation with very large sample
control_results = day01[day01['group'] == 'control']['converted']
treatment_results = day01[day01['group'] == 'treatment']['converted']

n_con = control_results.count()
n_treat = treatment_results.count()
successes = [control_results.sum(), treatment_results.sum()]
nobs = [n_con, n_treat]

z_stat, pval = proportions_ztest(successes, nobs=nobs)
(lower_con, lower_treat), (upper_con, upper_treat) = proportion_confint(successes, nobs=nobs, alpha=0.05)

print(f'z statistic: {z_stat:.2f}')
print(f'p-value: {pval:.3f}')
print(f'ci 95% for control group: [{lower_con:.3f}, {upper_con:.3f}]')
print(f'ci 95% for treatment group: [{lower_treat:.3f}, {upper_treat:.3f}]')
```

```
z statistic: 0.54
p-value: 0.592
ci 95% for control group: [0.113, 0.137]
ci 95% for treatment group: [0.109, 0.132]
```

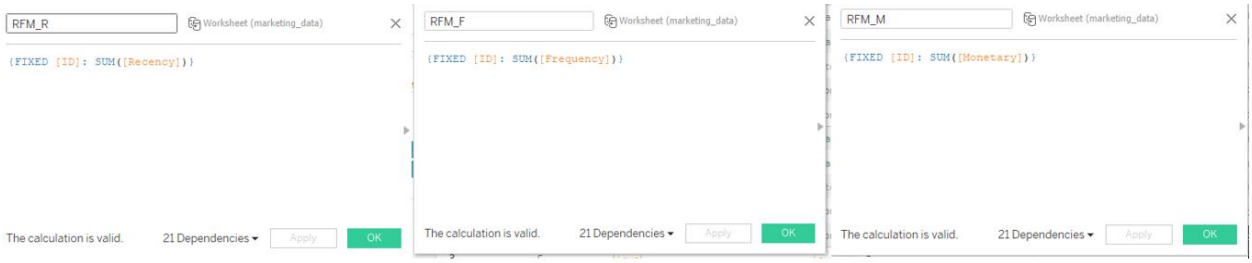
iii. Data Visualization

After the data is clear both AB testing and sales, we need to input those data in the dashboard tableau and do some analysis in tableau part.



1. Data Marketing – RFM Analysis

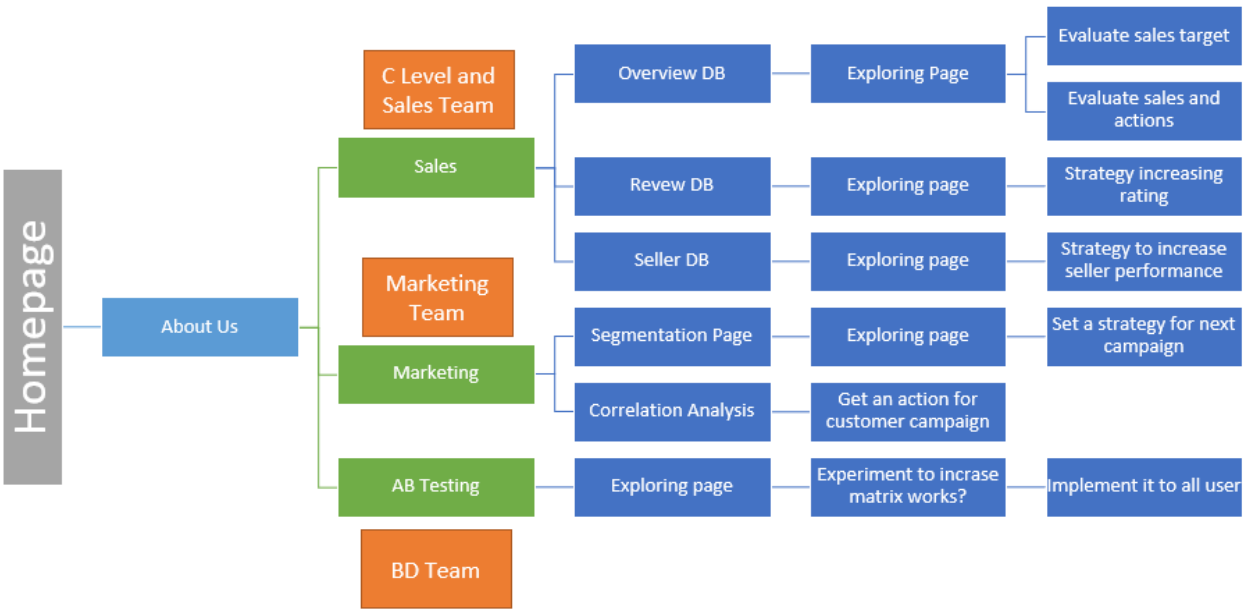
   While other dashboard (sales and ab test) is done in python, for RFM analysis calculation is happened in tableau. We'll create analysis based or Recency (last time they buy our product), Frequency (how many times they order our product), and Monetary (total sales). After that we're grouping them into several group based on RFM score.



		RFM_M_Code				
RFM_R_C..	RFM_F_C..	5	4	3	2	1
5	5	Champions	Champions	Loyal		Potential Loyalist
	4	Champions	Champions	Loyal	Potential Loyalist	
	3	Potential Loyalist	Potential Loyalist	Potential Loyalist	Potential Loyalist	Potential Loyalist
	2	Promising	Promising	Promising	New Customers	New Customers
	1	Promising	Promising	Promising	New Customers	New Customers
4	5	Champions	Champions	Loyal		
	4	Champions	Champions	Loyal		
	3	Potential Loyalist	Potential Loyalist	Potential Loyalist	Potential Loyalist	
	2	Promising	Promising	Promising	New Customers	New Customers
	1	Promising	Promising	Promising	New Customers	New Customers
3	5	Loyal	Loyal	Potential Loyalist		
	4	Loyal	Loyal	Need Attention		
	3	Need Attention	Need Attention	Need Attention	Need Attention	About to Sleep
	2	Need Attention	Need Attention	Need Attention	About to Sleep	About to Sleep
	1	Need Attention	Need Attention	About to Sleep	About to Sleep	About to Sleep
2	5	At Risk	At Risk	At Risk		
	4	At Risk	At Risk	At Risk	About to Sleep	
	3	At Risk	At Risk	At Risk	About to Sleep	
	2	At Risk	At Risk	Hibernating	Hibernating	About to Sleep
	1	At Risk	Hibernating	Hibernating	Hibernating	Hibernating
1	5	Cannot Lose Them	Hibernating	Hibernating	Hibernating	
	4	Cannot Lose Them	Cannot Lose Them	Hibernating		
	3	Cannot Lose Them	Cannot Lose Them	Hibernating	Hibernating	
	2	Cannot Lose Them	Cannot Lose Them	Hibernating	Lost	Lost
	1	Cannot Lose Them	Cannot Lose Them	Lost	Lost	Lost

b. User Flow

   After the dashboard is finished and published publicly, here is the userflow that we hope will be run by the user. With this userflow, it will answer some of the questions that have been stated in the previous sub-chapter.



Feature	**Sales Dashboard**
Description	Will show you the sales general information from total sales, total order growth size, also for review and seller performance
Purpose	The user can see the company key matrix performance and drill it down into 3 big categories (sales, review, and seller)
User problem	a. C Level: they need to know key matrix company performance live and updated to conclude a company direction b. Sales team: they need to see the performance of each category and product, and drill it down to get more insight to increase their sales
User value	Sales dashboard: Providing information related to sales and operations performance such as order, profit, review and seller information. It will support our C-level to get a quick update and quick actions and support our sales team to increase their sales
Assumptions	The data collections of this project are valid and no exception on the data (i.e. return, false order etc)
Not doing	It will not show the impact of sales based on Profit and Loss Financial report
Acceptance criteria	When our C-level can get a quick information and our sales team can drill down the performance and analysis on the data

Feature	**Marketing Dashboard**
Description	Will show RFM analysis and cohort analysis to see our customer engagement
Purpose	The user can see customer segmentation and customer retention analysis
User problem	Marketing team: they need to monitor their performance on current user characteristic and effectiveness of marketing campaigns
User value	Marketing dashboard: Providing information related to data marketing and customer analysis, so marketing team can easily focus on action based on data instead of analyzing and monitoring manually
Assumptions	The data collections of this project are valid and no exception on the data (i.e. return, false order etc)
Not doing	It will not show the impact of marketing based on Profit and Loss Financial report
Acceptance criteria	When our marketing team drill down the performance and analysis on the data marketing

Feature	**AB Testing Dashboard**
Description	Will show which landing page is better based on data analysis
Purpose	The user can see the analysis between options A and B and decide the business insight from that
User problem	Business Development team: they need to see based on data the test the effectiveness of the new landing page
User value	AB Testing dashboard: Providing information related to experimentation on landing page, so user can see the best options for every decision to make
Assumptions	The data collections of this project are valid and no exception on the data (i.e. return, false order etc)
Not doing	It will not show the impact of AB test based on Profit and Loss Financial report
Acceptance criteria	When our BD team can create a conclusions and business call based on dashboard

4. MVP Demonstration
   With the data clean and clean and then processed properly and according to the problem we stated earlier, here is an MVP demonstration to explain the features and functions. Here is also attached the dashboard link for further testing.

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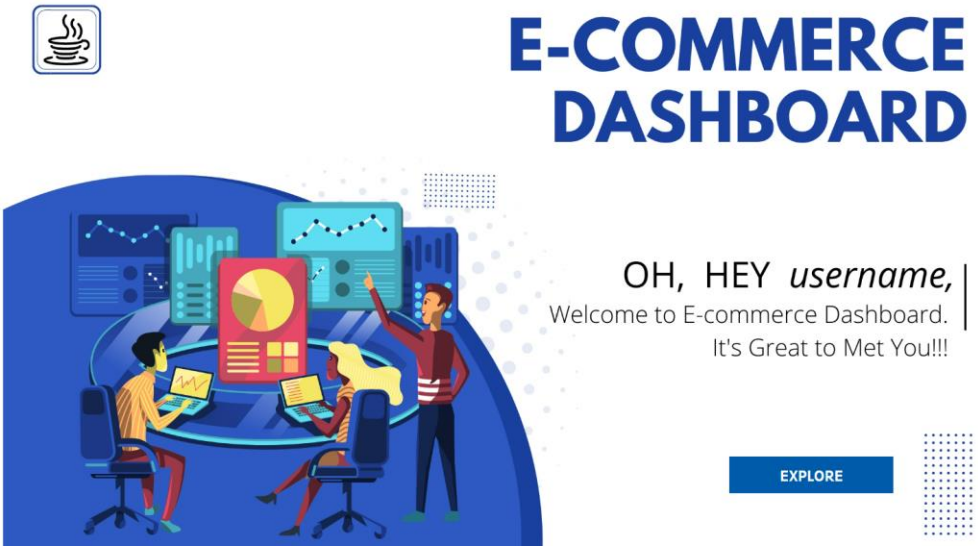
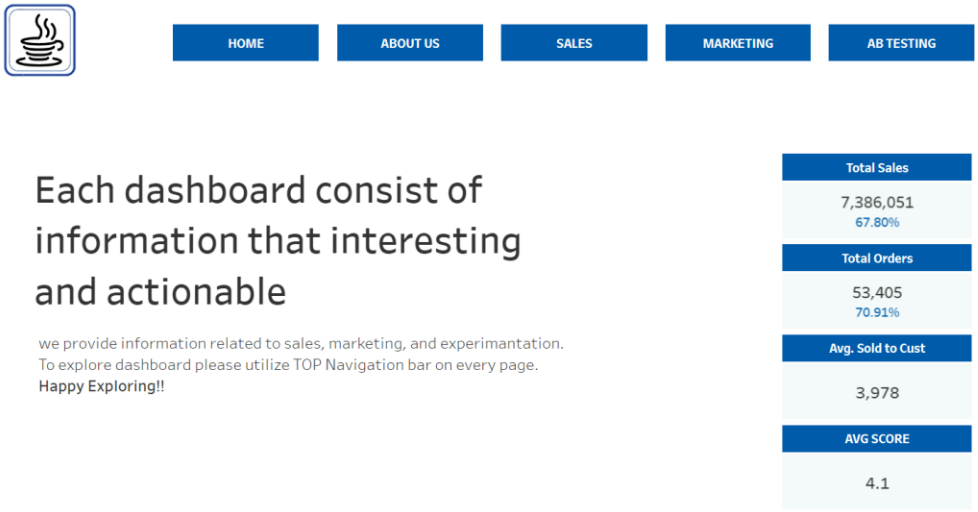
   a. Homepage Dashboard
      An opening page when you're accessing the dashboard, shows you dashboard title and your username (means you're already login correctly)

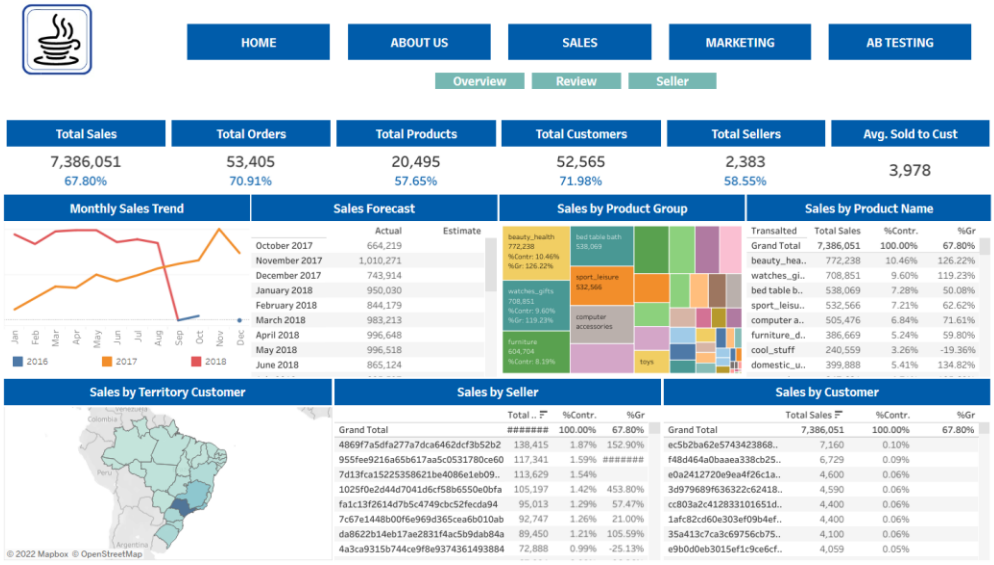


   b. About us Dashboard
      Showing how to use dashboard and which area (sales/marketing/Abtest) you want to explore. In this page shows overall dashboard performance (sales, order,etc)



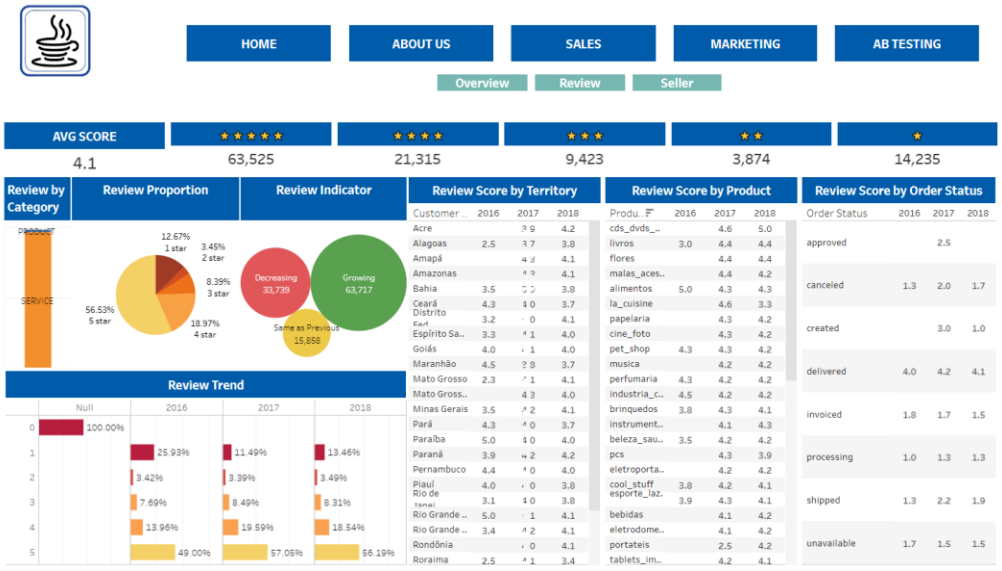
c. Sales dashboard – Overview

Showing overall performance in sales data, from monthly sales, forecast, sales per area (region, product, top seller and top customer) and their growth



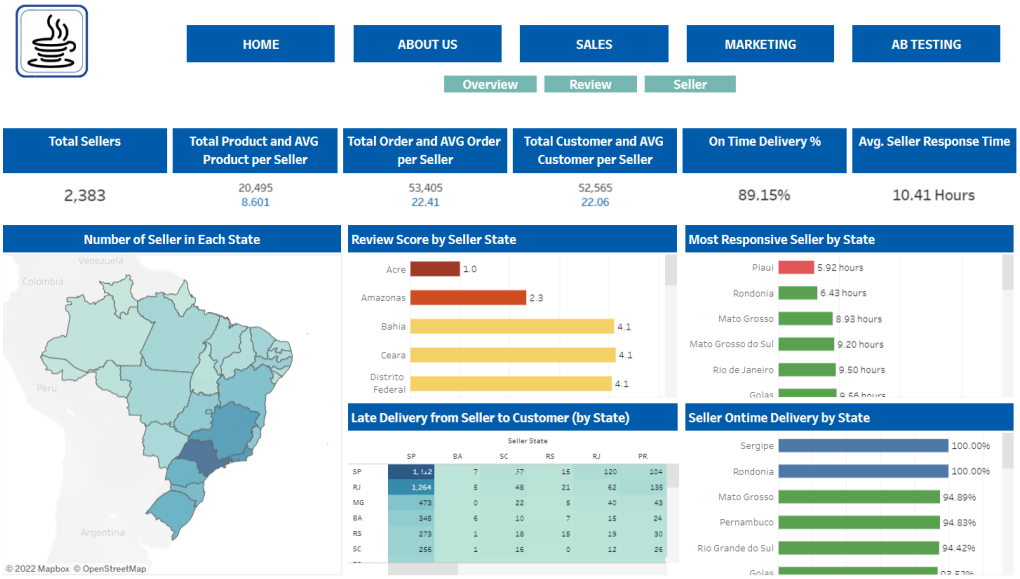
d. Sales Dashboard – Review

Showing review category and performance, it has review proportions, indicator and trend also.



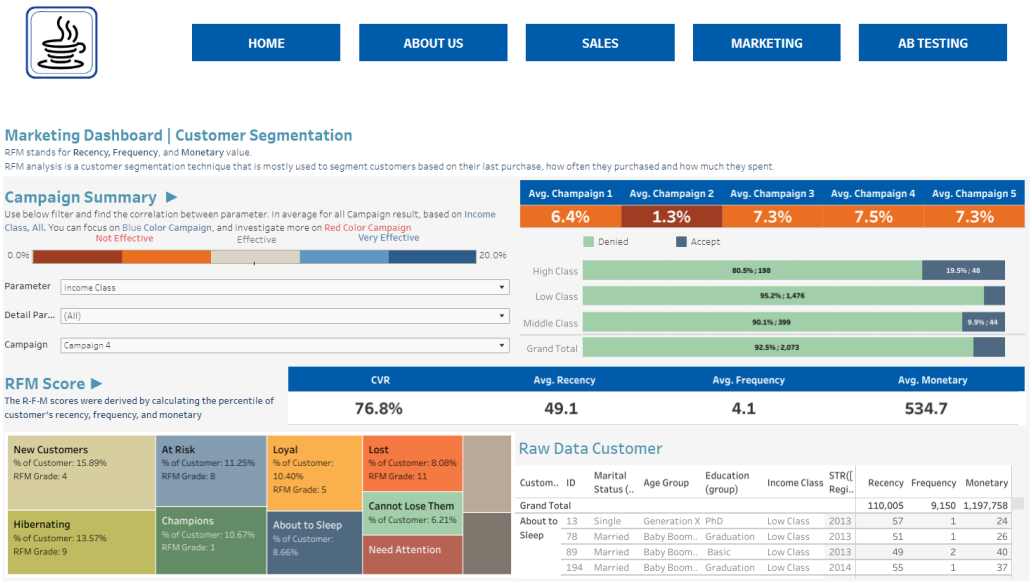
e. Sales Dashboard – Seller

Showing your seller performance, we can check based on review, response and number seller per area



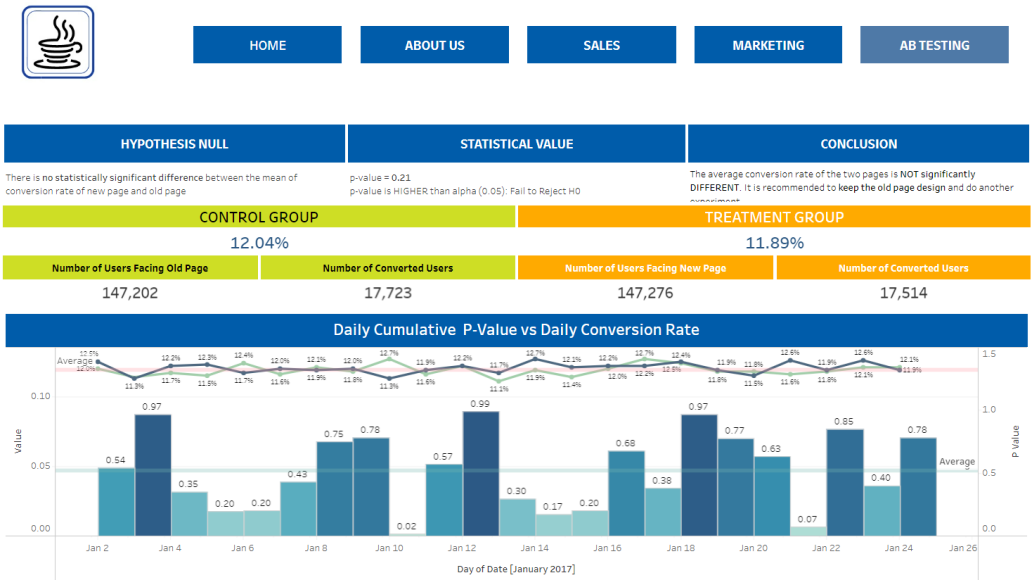
f. Marketing dashboard – Customer segmentation

Showing how you played with data correlation in several parameter and its impact to champaign result. Also break it down customer level based on RFM score.



g. AB Testing

Showing a result of ab testing, based on the data processing on phyton on previous segment.



5. Analysis and result

Based on dashboard in previous segment, we can get some conclusions from the data and we can split it into several segment as per below.

a. Beauty health, watches and furniture is our strong point on our sales, that 3 products can generate 28% from total sales, and our sales is growing if we compare 2017 and 2018 on same period

b. Review in average is 4.1 with mostly focus on service, and if we see reviews is getting better every year

c. Late delivery mostly happened from sau paulo in same city. The main reason is because most of the order is coming from this city
d. On marketing side, high class customer group having overall high CVR and high champaign accepted. Most of high-class customer is segmented as champions by 20% and at risk by 19%
e. On AB testing, because of P value 0.21 and it's higher than alpha (0.05) so it fails to reject H0. Resulting the two pages (old and new) is not significantly different

6. Reference
    a. Sales data
    Dataset E-commerce - Google Dokumen

    b. Marketing data
    Dataset Marketing - Google Dokumen

    c. AB testing
    Dataset A/B Testing - Google Dokumen