

Report Homework 2

Dashboard

0.- Introduction

In this homework we are assigned to create a Dashboard for an Account Manager who has to review some Data (provided). We should have special consideration to HCI principles as well as Perception principles.

1.- Data Description

In this section we will describe the dataset. The source of this dataset is Watson Analytics : <https://www.ibm.com/communities/analytics/watson-analytics-blog/guide-to-sample-datasets/>
 It's a sample Data set useful to better understand the hidden trends and patterns of the sales of a company, that's why it is suited for our exercise (to create a Dashboard).

	Year	Product line	Product type	Product	Order method type	Retailer country	Revenue	Planned revenue	Product cost	Quantity	Unit cost	Unit price	Gross profit	Unit sale price
0	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Telephone	United States	315044.33	437477.15	158371.76	66385.0	2.552857	6.59	156672.57	5.195714
1	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Telephone	Canada	13444.68	14313.48	6298.80	2172.0	2.900000	6.59	7145.88	6.190000
2	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Telephone	Mexico	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Telephone	Brazil	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Telephone	Japan	181120.24	235236.64	89413.06	35696.0	2.657000	6.59	91707.18	5.488000

Fig 1 : First entries of the Data.

Let's see its features/dimensions in detail . We will describe (if applies) the following characteristics:

- 1) The type of the data
- 2) The range of the values
- 3) Which units are used
- 4) What precision is required
- 5) If it this unit has a temporal and if yes what is the life span
- 6) If there are outliers

Year

- 1) The attribute type of the year is ordered and more specifically it is quantitative, 2) The range are the years between 2004 and 2007, 3) The units that are used are: 2004, 2005, 2006, 2007, 4) integer precision, 5) The lifespan of each unit is one year (365 days), 6) There are no outliers

From each year it corresponds to several Product Lines :

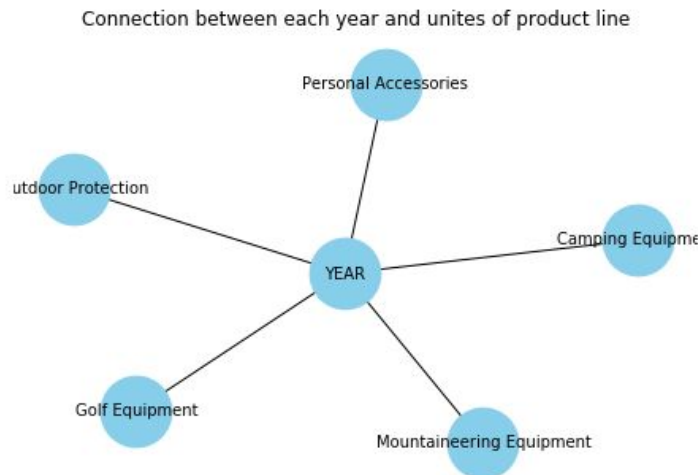


Fig 2 : For each year 5 Product Lines

Product line

1) The attribute type of the Product line is categorical, 2) There are 6 elements, 3) The units that are used are Camping Equipment, Personal Accessories, Outdoor Protection, Golf Equipment, Mountaineering Equipment, 4) -, 5) -, 6) There are no outliers
 Each Product Line is connected to several Product Types

Connection between each product line and unites of the product type

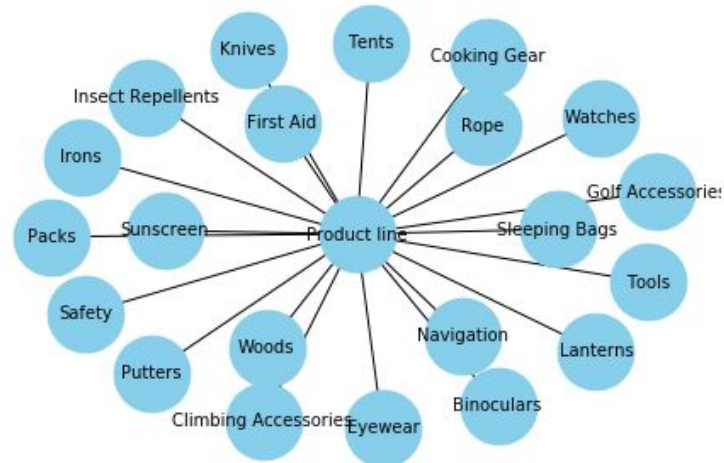


Fig 3 : Product Line connection to Product Types

Product type

1) The attribute type of the Product type is categorical, 2) There are 21 unites, 3) The unites that are used are: Cooking Gear, Tents, Sleeping Bags, Packs, Lanterns, Watches, Eyewear, Knives, Binoculars, Navigation, Insect Repellents, Sunscreen, First Aid, Irons, Woods, Putters, Golf Accessories, Rope, Safety, Climbing Accessories, Tools, 4) -, 5) -, 6) There are no outliers

Connection between each product type and unites of products (30 of the products)



Fig 4 : Product Type connection to Products

Product

1) The attribute type of the Product is categorical, 2) There are 144 unites, 3) The unites that are used are: TrailChef Water Bag, TrailChef Canteen, TrailChef Kitchen Kit, TrailChef Cup, TrailChef Cook Set, TrailChef Deluxe Cook Set, TrailChef Single Flame', 'TrailChef Double Flame', TrailChef Kettle, TrailChef Utensils, Star Lite, Star Dome, Star Gazer 2, Star Gazer 3, Star Gazer 6, Star Peg, Hibernator Lite, Hibernator, Hibernator Extreme, Hibernator Self - Inflating Mat, Hibernator Pad, Hibernator Pillow, Hibernator Camp Cot, Canyon Mule Climber Backpack, Canyon Mule Weekender Backpack, Canyon Mule Journey Backpack ,..., Canyon Mule Extreme Backpack, Canyon Mule Cooler, Canyon Mule Carryall, Granite Pulley, Firefly Climbing Lamp, Firefly Charger, Firefly Rechargeable Battery, Granite Chalk Bag, Granite Ice, Granite Hammer, Granite Shovel, Granite Grip, Granite Axe, Granite Extreme, 4) -, 5) -, 6) There are no outliers

Order method type

1) The attribute type of the year is ordered and more specifically it is quantitative, 2) The there are 7 different units, 3) The unites that are used are: Telephone, Sales visit, Web, Special, Mail, E-mail, Fax, 4) -, 5) -, 6) -

Retailer country

1) The attribute type is categorical, 2) The range are the years between 2004 and 2007, 3) The unites that are used are: United States, Canada, Mexico, Brazil, Japan, Korea, China, Singapore, Australia, Netherlands, Sweden, Finland, Denmark, France, Germany, United Kingdom, Belgium, Switzerland, Austria, Italy, Spain, 4) -, 5) -, 6) There are no outliers

Revenue

1) The attribute type of the revenue is ordered and more specifically it is quantitative, 2) The range are the years between 0.0 and 10054289.0 and it also contains nans, 3) The unites that are used are: 315044.33, 13444.68, NAN, ..., 588468. , 331512. , 96216., 4) float precision, 5) -, 6) There are no outliers, the NAN can be considered as outliers

Product cost

1) The attribute type of the product cost is ordered and more specifically it is quantitative, 2) The range are the years between 5.7599999999999998 and 6756852.78000000003 and it also contains NANs, 3) There are 22988 unique unites: 158371.76, 6298.8 , nan, ..., 202920.24, 58894.32, 131605.08, 4) float precision, 5) -, 6) There are no outliers, the NAN can be considered as outliers

Quantity

1) The attribute type of quantity is ordered and more specifically it is quantitative, 2) The range are the years between 1.0 and 313628.0 and it also contains nans, 3) The unites that are used are: 66385., 2172., nan, ..., 4921., 3664., 7743., 4) float precision, 5) -, 6) There are no outliers the NAN can consider as outliers

Unit cost

1) The attribute type or unit cost is ordered and more specifically it is quantitative, 2) The range are the years between 0.8499999999999998 and 690.0, 3) The unites that are used are: 2.55285714, 2.9 , nan, ..., 21.16153846, 21.11666667, 18.2, 4) foat precision, 5) -, 6) The outliers are the Nan

Unit price

1) The attribute type of unit price is ordered and more specifically it is quantitative, 2) The range are the years between 690.0 and 0.8499999999999998, 3) The unites that are used are: 6.59, nan, 12.53, ..., 315.4 , 4.94, 65.45, 4) float precision, 5) -, 6) nan

Gross profit

1) The attribute type of unit price is ordered and more specifically it is quantitative, 2) The range are the years between 2.0600000000000001 and 1359.72, 3) The unites that are used are: 156672.57, 7145.88, nan, ..., 128591.76, 37321.68, 83398.92, 4) float precision, 5) -, 6) nan

Unit sale price

1) The attribute type of unit sale price is ordered and more specifically it is quantitative, 2) The range are the years between -18159.599999999999 and 3521097.7599999998, 3) The unites that are used are: 5.19571429, 6.19 , nan, ..., 38.58181818, 38.47272727, 38.57142857, 4) float precision, 5) -, 6) nan

2.- Analysis : Functional Analysis, User Analysis, Task Analysis

In this section we will do an analysis that should help us define the design of the Dashboard. This analysis is will be composed of :a Functional Analysis, a User Analysis and a Task Analysis.

The Functional Analysis is used to identify the ideal task space independent of implementations.

The User Analysis is used to identify the user/target characteristics.

The Task Analysis is used as a “deeper” functional analysis, identifying users actions and what the dashboard should provide to facilitate those actions.

2.1.- Functional Analysis :

For this task we have to prepare a dashboard for an Account Manager for a company that allegedly sell sports equipment. Such tool (Dashboard) should provide the key metrics to the Account Managers so they can have an overview of cost and revenue evolution, and also customer satisfaction (in this case translated by sells) in order to define future strategies.

Ideally the dashboard should give clear information about the current overall revenue and gross profit and the trend/evolution over time of this revenue (in order to detect a “ losing money” pattern) with proper charts. To give information about the preference of the clients, the dashboard will also give information of the most sold products.

2.2.- User Analysis :

As stated above, the users of the dashboard are the Account Managers of a company. Let's see the profile of this kind of users :

User Expertise :

Usually Accounts Managers are experts in their domain, with degree in fields such as Economics, Bussiness or even Maths. Other fields are also possible, if they are highly related to the company product (for example for a big mobile company, Account Managers may be Telecommunication Engineers)

Audience size :

Depending of the size of the company Account Managers go to one single person to a group of people requiring the same information. Some companies may have an Account Manager for each of the product lines, or subsidiaries, or even products. For this exercise we will consider that the user of the dashboard is in charge of the some product lines for all the countries where this company sells.

Technology platform:

Web browser. Either Tableau Server or some coded website. For this exercise will be the second option.

Screen type:

Standard Screen. The Dashboard should be suited for both laptop screen (as Account Managers tend to have several meetings where they bring the laptop) and a standard desk screen. Ideally it should be possible to be adapted to smartphone / tablet size if they need to check something and no computer is at their disposal.

2.3.- Task Analysis

As already hinted in a previous section, the dashboard will be the tool used by Account Managers to quickly check key metrics that may help them define strategies to improve revenues and clients satisfaction. That's why this dashboard should contain those keys in a understanding format, and easy to check. We defined the dashboard to have :

- The total gross revenue of the current year (we suppose that the current year is 2007)
- The total gross revenue over years.
- The gross revenue of the current year by product line.
- The gross revenue by country
- Detailed information of each product line, the user can select (interaction) the product line to be seen. This detailed information should contain the gross profits for each product and each country.

3.- Data encoding. Charts description.

The Dashboard we have designed is composed of two views, the main board with general metrics and the secondary view with detailed figures.

Main Board:

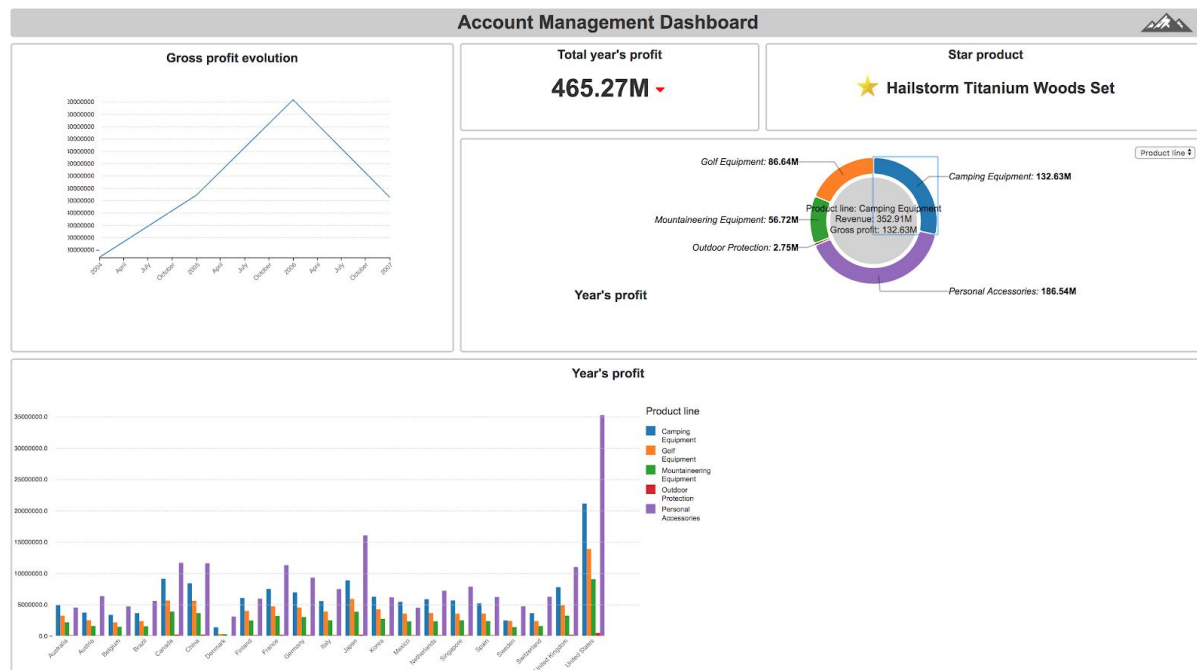


Fig 5 : Main board view of the Dashboard

From top left clockwise the charts are :

Chart 1: Line Chart

It describes the evolution of the gross profit over years. Its main functionality is to detect trends, i.e. for the Account Manager to see the trend of the gross profit, if it is growing or decreasing over time.

Y-axis : gross profit, dependent variable, quantitative in millions of dollars (M USD).

X-axis : time in months, categorical.

Perception principles : Connectedness and position

Chart 2.a : Donut Chart

Used to grossly compare between few attributes (the gross profit that come from each product line). With this chart the user can see what Product Line is doing the one with most gross profit. Some interaction is included

Perception principles: Size, colors. Each product line has a color associated.

Chart 2.b : Donnut Chart

We added the option to switch the Donut Chart to show information about the Gross Profit by Country (country view) instead of Product Line. The user can quickly see what Country has the biggest Gross Profit (and less Gross Profit)

Perception Principles : Size, Colors.

Chart 3 : Bar Chart

Y-axis: The gross profit of each Product Line in M USD.

X-axis : Countries, categorical variable.

Perception principles: Length, to compare which product line has generated more profits, in each country. Also the color, which uses the same encoding as in the Donut Char (2.a)

Appart from the charts, this view also includes two values (Top Middle and Right side) with the current year profit (for this exercise the assumption is that this year is 2007) with a little triangle indicating its trend (red indicating that the trend is decreasing) and the star product (the product generating most revenue).

Secondary Board :

In order to activate the secondary board the user must click to one of the regions of the Donnut Bar, either when it is in Product Line view or Country view. By clicking one of the regions (for example click on Camping Equipment in Product Line view) detailed information about the selected region is triggered.

- Product Line View

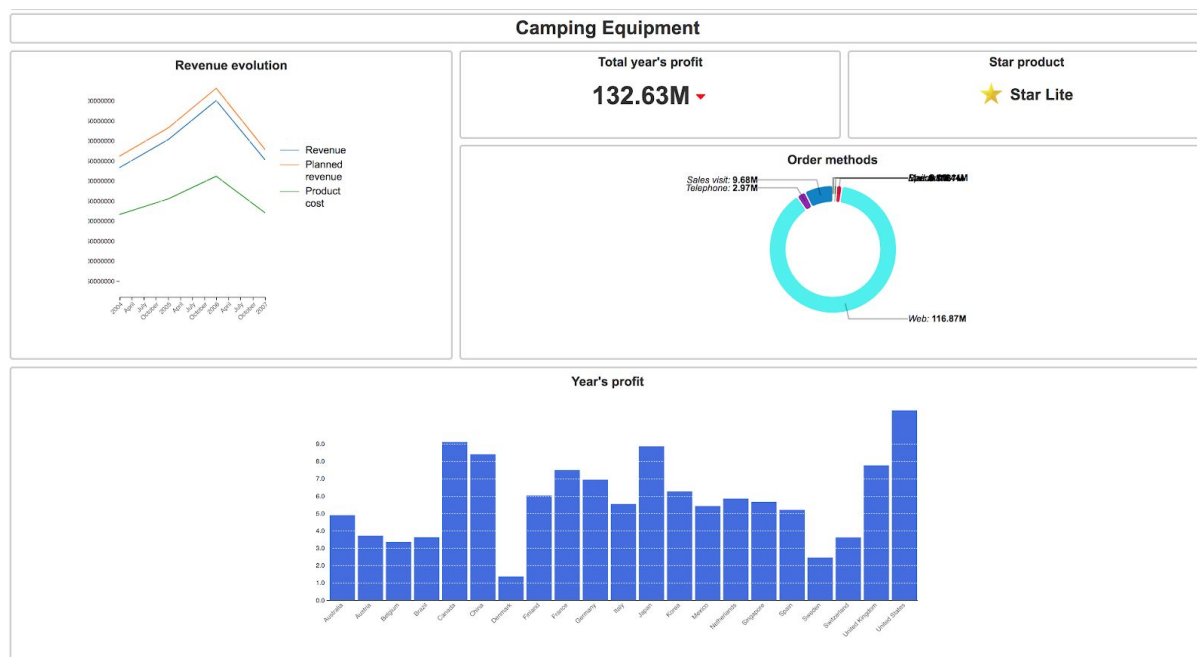


Fig 6 : Secondary view with details of the selected Product Line

From top left to bottom clockwise there are three charts :

Chart 1 : Line Chart - Multiple Lines in one Chart

Y-axis: Three magnitudes : Revenue, Planned Revenue and Aggregated product cost

X-axis : Months, categorial and ordered variable.

This chart describes the evolution of the Revenue for a selected Product Line. In the same plot there's also the planned revenue and the product cost. With this chart the user can easily how close is the revenue to the planned revenue and how far is from the product cost. Also it is possible to detect trends on this three values.

Perception principles : Connectedness and position

Chart 2 : Donut Chart

In this Donut Chart the user can see the proportion of the distinct Order Methods for a given Product Line. This can help the user design a strategy on the what order methods the company should invest more or less.

Perception principles : Color and size of each region.

Chart 3 : Bar Chart

Y - axis : Profits of the selected Product Line of the current year, in M USD.

X - axis : Countries, categorical variable.

Perception principles : Length, to in which country this product line has generated more profit.

Appart from the charts, this view also includes two values (Top Middle and Right side) with the current year profit (for this exercise the assumption is that this year is 2007) with a little triangle indicating its trend (red indicating that the trend is decreasing) and the star product (the product generating most revenue) for a selected Product Line.

- Country View

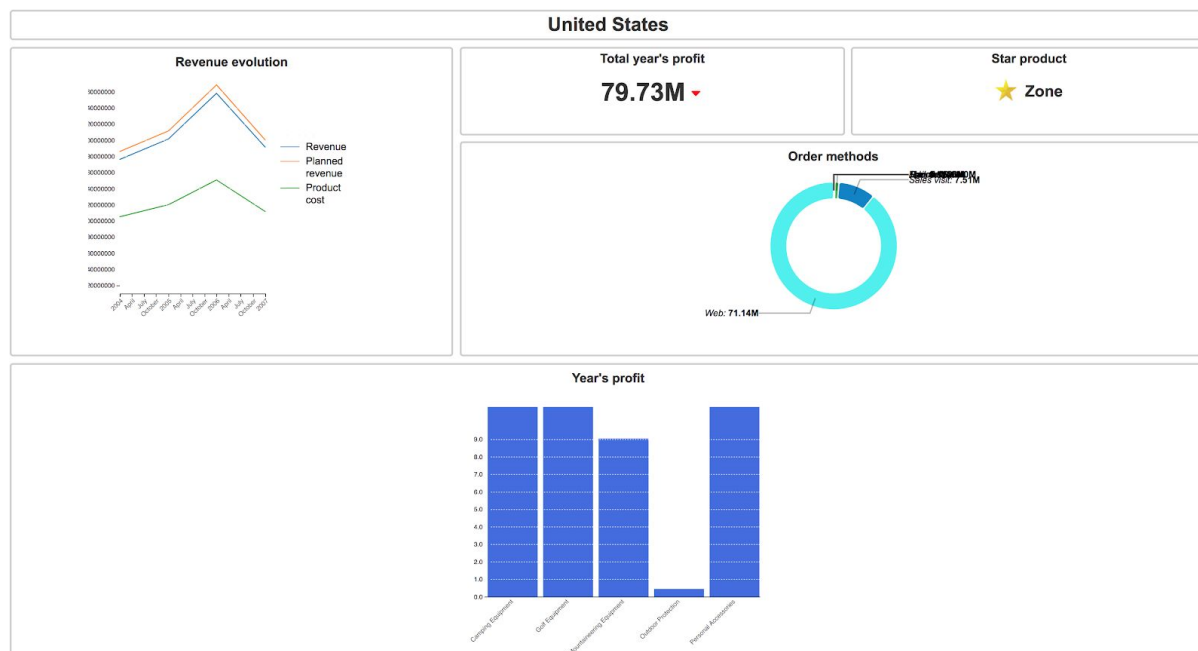


Fig 7: Secondary view with details of the selected Country

From top left to bottom clockwise there are three charts :

Chart 1 : Line Chart - Multiple Lines in one Chart

Y-axis: Three magnitudes : Revenue, Planned Revenue and Aggregated product cost in M USD.

X-axis : Months, categorial and ordered variable.

This chart describes the evolution of the Revenue for a selected Country. In the same plot there's also the planned revenue and the product cost. With this chart the user can easily how close is the revenue to the planned revenue and how far is from the product cost. Also it is possible to detect trends on this three values.

Perception principles : Connectedness and position

Chart 2 : Donut Chart

In this Donut Chart the user can see the proportion of the distinct Order Methods for a given Country. This can help the user design a strategy on the what order methods the company should invest more or less in a given Country. The user can also see what kind of order method is doing better in each country.

Perception principles : Color and size of each region.

Chart 3 : Bar Chart

Y - axis : Profits of the selected Product Line of the current year, in M USD.

X - axis : Product Lines , categorical variable.

Perception principles : Length, to see in which product line is doing better in the selected country.

Appart from the charts, this view also includes two values (Top Middle and Right side) with the current year profit (for this exercise the assumption is that this year is 2007) with a little triangle indicating its trend (red indicating that the trend is decreasing) and the star product (the product generating most revenue) for a selected Country.

4.- Components task:

The distribution of the tasks have been the following :

Montse Brufau : Code Gurú - Revision, Layout coding, , dashboard design

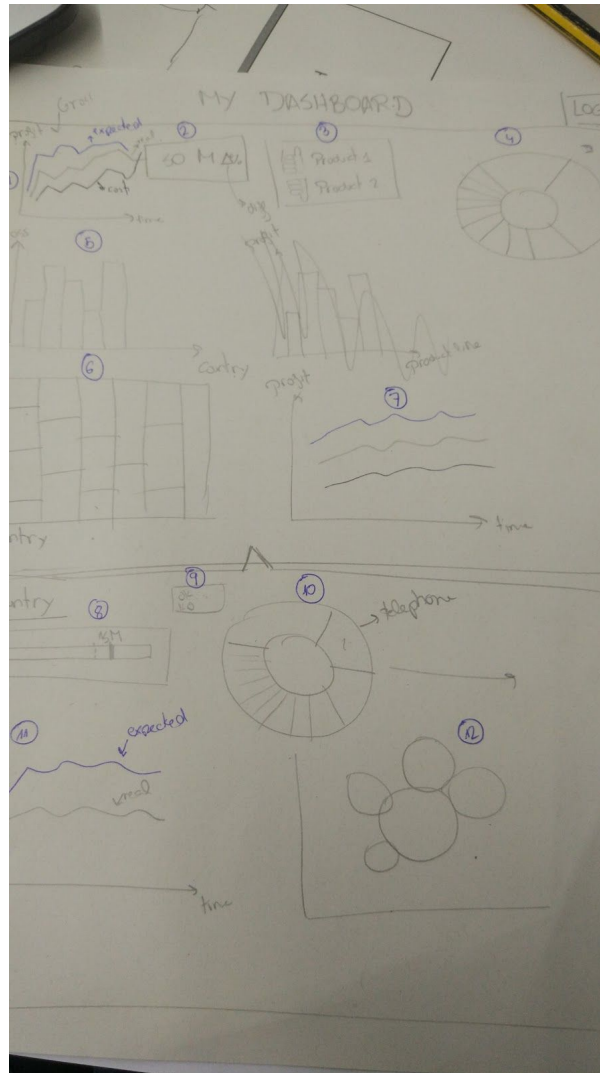
Alex Ferrer : Charts coding, dashboard design

Markos Gavalas : Data exploration and preparation, report, dashboard design

Jonatan Piñol : Secondary charts coding, report, dashboard design

5. Appendix

Handwritten draft :



Encountered Issues / difficulties :

We know that in this case, the dashboard should be fit to the screen (to minimize the necessity of scrolling the screen). We had that intention although the final result need scrolling.

In some donnut charts the the figures are overlapped. We tried to fix itwithout success.

Some of the initially planned charts drawn in the draft (such as bubbles charts, bullet charts and treemaps) have been discarded in the final version.