

# Wine and Vine Statistics Visualization Tool

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## ABSTRACT

Since the current visualization tool of the International Organization of Vine and Wine (OIV) doesn't offer a qualitative representation of wine data, we have decided to create a tool, that will give its user a better insight in the global wine production and consumption. First we had to occupy ourselves with getting familiar with different types of visualizations in order to produce something suitable and understandable. In this paper we will discuss the whole process from scratch until the finished tool and the problems we have encountered within.

**Keywords.** D3, Javascript, Wine data, Visualization, Rosling, Munzner, OIV, International Organization of Vine and Wine, Scatterplot, Line chart, bar chart, small multiples, HTML, CSS

## 1 MOTIVATION

The motivation to occupy ourselves with wine data, during the visualization course, came from the fact that we are living in a country where a lot of wine is consumed and produced. During our research while we were looking for data which would contain the information on consumption, export and many more facts about wine, we came across the website of the International Organisation of Vine and Wine (OIV) who already provided a visualization tool. However the visualization was not that great and rather one-dimensional, leaving little room to let their users explore the data.

### 1.1 Tasks

The goal of visualizing this data, is to provide the OIV and their users with a tool that enables them to recognise current trends in the viticultural field. This should make it possible for them to contribute to international harmonisation of existing practices and standards and if necessary to the preparation of new international standards in order to improve the conditions for producing and marketing vine and wine products, as well as helping to ensure that the interests of consumers are taken into account. Their current visualization only provides a one dimensional view of the available data, which allows little room to explore. The user can only select one attribute (e.g. Import) at a time and then has to choose if he wants to see the data of multiple countries for one year or the data for multiple years but only one country. This then produces a line chart and a bar chart.

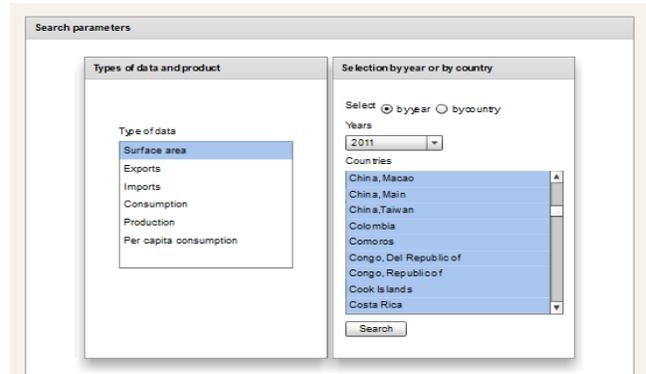


Figure 1: OIV visualization tool parameter selection

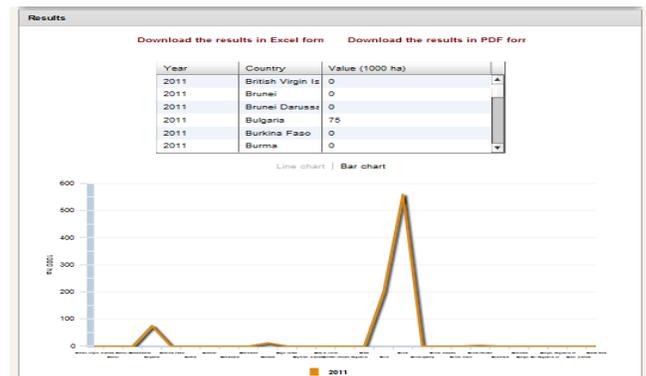


Figure 2: OIV visualization tool line chart

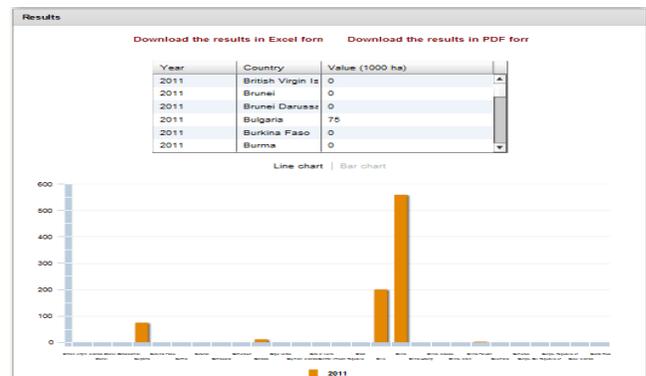


Figure 3: OIV visualization tool bar chart

### 1.2 User

The International Organisation of Vine and Wine was created in 1924 in response to the global viticultural crisis. Today the OIV is the scientific and technical reference organisation for the entire viticultural field. It has 46 Member States and 10 non-governmental observers. These 46 Member States account for more than 85% of global wine production and nearly 80% of world consumption.

We can identify our users to be these 46 member States, all ob-

servers, other clients of the OIV and the OIV themselves.

### 1.3 Data

The data set used for this project was provided by International Organisation of Vine and Wine. It contains information about the production, consumption, consumption per capita, surface area, export and import of wine of 167 countries. We decided to split the data into multiple CSV files, each containing information about one attribute.

## 2 RELATED WORK

A similar approach to visualizing data, that we took inspiration from was presented by Hans Rosling in his Ted Talk from 2006. In his approach Rosling presented his data in 3 dimensions through a scatterplot. He gave the x-axis and the y-axis each a different scale and also used the size of the dots as another scale.[1]

Furthermore we used Tamara Munzners Book "Visualization Analysis & Design: Abstractions, Principles, and Methods"[2] as a reference on how to create usefull visualization tools. In her book she presents rules of thumb to guide design and an overall guide on how to work with data to visualize it in a way that lets the user fully discover it.

## 3 APPROACH

On our first attempt we created three prototypes which consisted of three different diagrams. The only thing all prototypes had in common was the world map, which should be connected with the diagrams and the menu. If you would have clicked on a country on the world map or search a country via the field, the country on the map would change the color to red. We only implemented that feature so the user would know, where the country he had selected actually was. The prototypes included a slider, where the user could check the data for a certain time period and checkboxes, through which he could look up the import or export, just to name some examples. In figure 4 we see the world map connected to a line graph. On the other hand we see in figure 5 the same world map and a bar chart linked to each other. Figure 6 contained a pie chart.

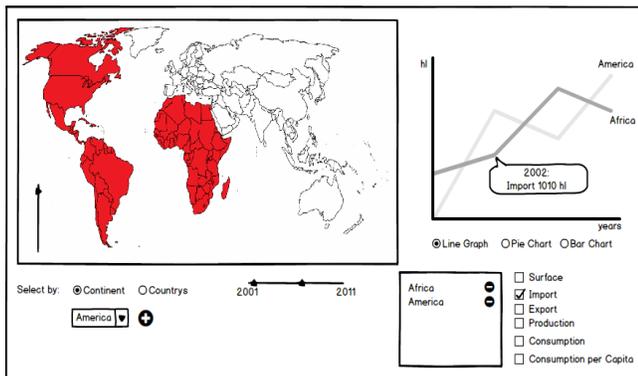


Figure 4: Prototyp 1 with line graph

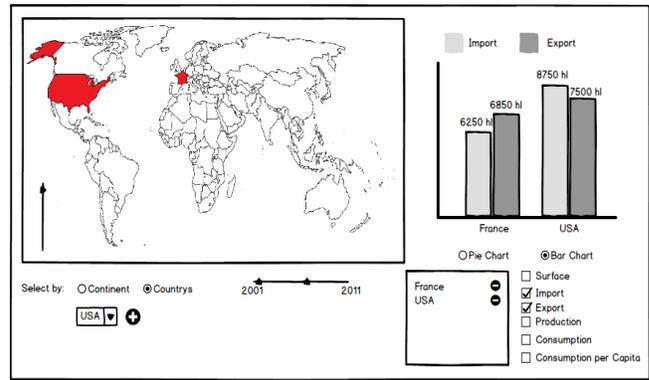


Figure 5: Prototyp 2 with bar chart

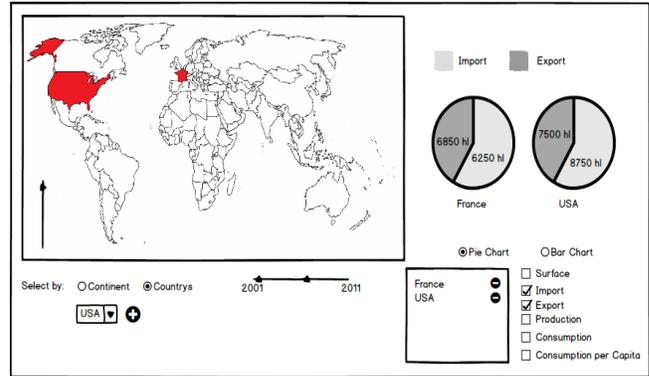


Figure 6: Prototyp 3 with pie chart

### 3.1 Visualization design

After we had received our feedback from our fellow colleagues and our visualization instructors, we decided upon their advice to include correlations and clusters. The thing we did wrong, was that we tried to create a tool, which would have diverse variations of visualizations, rather than a three-dimensional display of the data. So our first high-fidelity ended up like shown in figure 7.

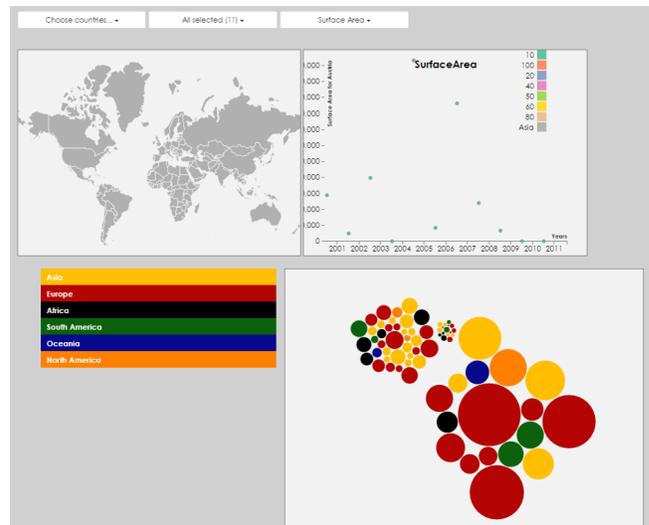


Figure 7: High-fidelity 1

We had replaced the checkboxes and the slider with a drop-down menu in order to make it easier for the user to work with the data and the tool, whereas the diagrams were replaced with a scatterplot and a bubble chart. We also added some colors to the

dots and the bubbles to distinguish between the continents.

### 3.2 Reason for design choices

The next thing we learned, was that we not only had not enough time to connect the scatterplot and the bubble chart with the world map, but also that we actually did not know how to do that. The feedback we got also concluded that bubble charts are not a good choice for a visualization. So we decided to delete the world map, and to add small multiples instead, which could display all the attributes like the export and import. These small multiples were also able to display both, line graphs and bar charts, depending on which factors you selected, by years or continents. We also accomplished to link the scatterplot to these small multiples. In the end our final high fidelity looked like shown in figure 8.



Figure 8: High-fidelity 2

## 4 IMPLEMENTATION

### 4.1 System requirements

To run our visualization the server has to be able to handle HTML5, CSS, Javascript (including D3) and JQuery.

### 4.2 Implementation challenges

There were several challenges we encountered, during our visualization. One of them was formatting the data correctly in order to work with our visualization tool. In addition to that we were also challenged by combining multiple CSV files in one graph. Another problem were the diagrams, which we had selected to visualize our data. It was pretty hard to find some useful information about those diagrams and how to implement them, although there were different approaches for it. The main challenge was to review our Project from scratch after every feedback, in order to adjust it to the feedback we had received, in time. Furthermore we weren't very experienced with D3 and had to learn a lot of it on the go.

## 5 RESULTS

In this section we are going to show a basic user scenario, how the tool can be used and what actions are possible. We will also present the feedback that we received during our evaluation.

### 5.1 User scenario

Fictional User: Ted Thatcher, who is a hard working member of the International Organisation of Wine and Vine, was instructed by the national government of the United States to compare their import, export and consumption per capita with different countries of Europe and Asia, in order to adapt those factors to the current situation. They also want him to look for a trend in this visualization, which could help them adapt these factors in the future. By clicking through the homepage of the OIV, Ted finally

gets to the visualization tool.

The first thing he does, is selecting the continents via the dropdown menu. With the second dropdown menu Ted selects the countries, which he wants to compare with the United States. He also adjusts the years by manipulating the slider. He then selects import, export and consumption per capita, which puts import on the y-axis and consumption per capita on the x-axis of the scatterplot while the export is represented by the size of the dots. By looking at the scatterplot Ted can now inspect the filtered data. With the mouseover of certain dots, the information about the export, import and consumption per capita of the different countries is shown. Looking at the small multiples, which are above the scatterplot, Ted gets an insight of the trend throughout the years, which tells him that the export and the consumption per capita will stay on the same level over the next years. Depending on the current situation of the United States, he will tell the government to rather raise or drop the import in the future. Ted can also alter the bar charts to a line graph, when he chooses to display the data by continents and not by years as well as click on a dot, line, bar or on the legend to highlight a specific continent in all graphs.



Figure 9: Small multiples with bar chart

### 5.2 Performance of the system

The System performs great and loads most of the data in no time. The only weak performance shows up when altering the selected continents in the dropdown menu. When a continent is selected or deselected all of the small multiples and the scatterplot have to be recalculated and repainted which leads to a performance leak.

### 5.3 Feedback from the evaluations

We generally received mixed to positive feedback from our colleagues and participants. All of them agreed, that our visualization tool was better than the one offered by the International Organisation of Vine and Wine. The fact that some dots in the scatterplot were too small has been criticized by the participants and colleagues. We also got feedback from our visualization instructor, who pointed out that our scatterplot would benefit from a zoom option and that we should try to avoid scrolling between our diagrams the next time because it would have an exhausting effect on the user over time.

## 6 DISCUSSION

### 6.1 Strengths and weaknesses

#### 6.1.1 Strengths

The greatest strength of our visualization is its simplicity and that we have achieved a better visualization than the one offered from the International Organisation of Vine and Wine. The display of our data is easy to understand and significant because it is displayed in more than just one dimension. Even handling shouldn't be a problem for the common user. We also accomplished to connect

our small multiples with each other and the scatterplot in order to make it interactive. Additionally we took care of which colour to use for our diagrams, in order to make it possible for the colour-blind users to distinguish among the lines in the line graph, the bars in the barchart and the dots in the scatterplot. Those colours are also easy to look at, but they still provide great difference to each other, so the user can easily tell them apart.

### 6.1.2 Weaknesses

The greatest weakness is the scatterplot, which does not feature a zoom option for the user to show the difference between the countries with smaller production or consumption. They are gathered in the lower left corner, which makes it difficult for the user to read the information. We also weren't able to include the worldmap in our final visualization and the selection or deselection of continents is very slow.

## 6.2 Lessons learned

The lessons we learned are that we could not implement most of our ideas, due to the little time we had in between the deadlines and the lack of our technical knowledge about D3, that lead us to finding quick and different solutions to our prior ones. Most of the time we had to review our project from scratch and adjust it to the feedback we got. Another lesson we learned is, that you need some time to get used to the technologies, before you can start programming something useful. Throughout our project, we also experienced how mighty D3 is and its possibilities for design implementation, which seems to get to no end. Things we also learned is that a well structured division of work is beneficial. But the main lesson we learned is that, if we had to do our project again, we would approach it differently, starting with adjusting the dataset correctly.

## REFERENCES

- [1] H. Rosling: The best stats you've ever seen, TED Talk, 2006  
[http://www.ted.com/talks/hans\\_rosling\\_shows\\_the\\_best\\_stats\\_you\\_ve\\_ever\\_seen?language=en](http://www.ted.com/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen?language=en)
- [2] T. Munzner: Visualization Analysis & Design: Abstractions, Principles, and Methods, CRC Press, 2014  
<https://www.crcpress.com/product/isbn/9781466508910>