



GLOBAL COST OF LIVING



Paola Maria Cavana [859341], Yuliia Tsymbal [894213]

Contents

1. Introduction	3
2. Description of the datasets	5
3. Infographics	8
3.1. Numbeo's cost of living index	8
3.2. Cost of living in the world	9
3.3. Cost of living in Italy	11
3.4. Salary in Italy	12
3.5. Apartment cost in Italy	13
3.6. Salary VS apartment Cost in Italy	14
3.7. McMeal at McDonalds	15
3.8. Cost of food at the market by countries	16
3.9. Comparison between beer and water	17
3.10. Transport comparison across the world	18
3.11. Transport by city	19
3.12. Education	21
4. Quality assessment	23
4.1. Users	23
4.2. Heuristic Evaluation	23
4.2.1. Our tasks	24
4.3. Psychometric questionnaire	24
4.4. Results	25
4.4.1. Heuristic test	25
4.4.2. Heuristic evaluation	26
4.4.3. Psychometric questionnaire	31
5. Conclusion and future developments	34

1. Introduction

The cost of living is the amount of money necessary to cover basic expenses such as: housing, food, taxes and healthcare, in a certain place and a certain period of time and is often used to compare how expensive it is to live in one city versus another.

That depends on your salary. If the costs are higher in a city, such as New York, for example, wages levels must be higher so that people who live in this city may be able to live there without problems. A wage might enable a greater standard of living in a place where everyday costs like rent, food, and entertainment are lower. As a result, the cost of living can be a key element in the development of personal wealth. On the other hand a high salary can seem insufficient in an expensive city.

So, measurement of the cost of a minimum standard of living is essential in determining relief payments, social-insurance benefits, family allowances, tax exemptions, and minimum wages. Measurements of change in the cost of living are important in wage negotiations. It is difficult, however, to make precise comparisons over time, because consumer tastes and the availability of products change, and also we have to bear in mind that throughout the world, every day, the prices of goods and services increase. Even in prosperous nations, growing living costs are painful. The effects can be disastrous in areas already experiencing conflict, natural catastrophes, or other crises. The rising cost of living has been associated with a reduction in wellbeing, including increased anxiety and worsening mental health.

The goals of this project :

1. To identify the best and worst countries in terms of living standards and understand why.
2. To identify the best and worst cities in terms of living standards and understand why.
3. To determine which regions have higher average salary, whether there are any obvious regularities.
4. Observe apartment cost for Italian cities.

5. To determine if there are such cities in Italy where the level of wages is at the same level but the price for rent in some of them is lower.
6. Identify where the price of a menu at McDonald is particularly high and particularly low.
7. Analyze the average cost of food and drink in the market of countries.
8. Find out if in some countries beer costs more than water.
9. Identify countries with globally underdeveloped public transport.
10. Are there cities in different countries where the monthly use of a private car (already available) is cheaper than the monthly use of public transport.
11. Comparing the costs of education.

2. Description of the datasets

For our project we used three datasets. The first dataset contains information on the cost of living in 140 countries in 2022. We obtained this data through the scraping of Numbeo's site with a program written in Python. Numbeo is the world's largest cost of living database and is also a crowd-sourced global database of quality of life data: housing indicators, perceived crime rates, healthcare quality, transport quality, and other statistics.

In this site indices are relative to New York City (NYC). Which means that for New York City the index should be 100(%). If another city has, for example, an index of 120, it means that on average in that city the cost of living is 20% more expensive than in New York City. If a city has an index of 70, that means the average cost of living in that city is 30% less expensive than in New York City. In the site Numbeo is explained that: "The Cost of Living Index is a relative indicator of consumer goods prices, including groceries, restaurants, transportation and utilities. Cost of Living Index does not include accommodation expenses such as rent or mortgage and is built based on our *best guess* of average expenses in a given city for a four-person family".

The second dataset we refer to is available on the Kaggle platform which in turn, even this, was obtained from a scraping activity on the Numbeo site. This dataset contains information about the cost of living in almost 5000 cities across the world updated on 3 December 2022. For each city we are provided with prices of various products and services, such as: water, gasoline, price per square meter to buy an apartment outside of center, one-way ticket for local transport, etc. Also in this case, these prices are provided in USD, and we decided to keep this currency because there is not a big difference with the euro.

We noticed that the column names are represented with numbers instead of their actual, descriptive values. To make it simpler to understand what values are in use on screen, we update them to their proper names. There's

even a column in the dataset called "Data quality" which is a binary value indicating whether or not more data is needed for more accurate results.

Hence, the dataset contains all the following informations:

- Name of the city
- Name of the country
- Meal, Inexpensive Restaurant
- Meal for 2 People, Mid-range Restaurant, Three-course
- McMeal at McDonalds (or Equivalent Combo Meal)
- Domestic Beer (0.5 liter draught, in restaurants)
- Imported Beer (0.33 liter bottle, in restaurants)
- Cappuccino (regular, in restaurants)
- Coke/Pepsi (0.33 liter bottle, in restaurants)
- Water (0.33 liter bottle, in restaurants)
- Milk (regular), (1 liter)
- Loaf of Fresh White Bread (500g)
- Rice (white), (1kg)
- Eggs (regular) (12)
- Local Cheese (1kg)
- Chicken Filets (1kg)
- Beef Round (1kg) (or Equivalent Back Leg Red Meat)
- Apples (1kg)
- Banana (1kg)
- Oranges (1kg)
- Tomato (1kg)
- Potato (1kg)
- Onion (1 kg)
- Lettuce (1 head)
- Water (1.5 liter bottle, at the market)
- Bottle of Wine (Mid-Range, at the market)
- Domestic Beer (0.5 liter bottle, at the market)
- Imported Beer (0.33 liter bottle, at the market)
- Cigarettes 20 Pack (Marlboro)
- One-way Ticket (Local Transport)
- Monthly Pass (Regular Price)

- Taxi Start (Normal Tariff)
- Taxi 1 km (Normal Tariff)
- Taxi 1 hour Waiting (Normal Tariff)
- Gasoline (1 liter)
- Volkswagen Golf 1.4 90 KW Trendline (Or Equivalent New Car)
- Toyota Corolla Sedan 1.6I 97kW Comfort (Or Equivalent New Car)
- Basic (Electricity, Heating, Cooling, Water, Garbage) for 85m² Apartment
- 1 min. of Prepaid Mobile Tariff Local (No Discounts or Plans)
- Internet (60 Mbps or More, Unlimited Data, Cable/ADSL)
- Fitness Club, Monthly Fee for 1 Adult
- Tennis Court Rent (1 Hour on Weekend)
- Cinema, International Release, 1 Seat
- Preschool (or Kindergarten), Full Day, Private, Monthly for 1 Child
- International Primary School, Yearly for 1 Child
- 1 Pair of Jeans (Levis 501 Or Similar)
- 1 Summer Dress in a Chain Store (Zara, H&M, ...)
- 1 Pair of Nike Running Shoes (Mid-Range)
- 1 Pair of Men Leather Business Shoes
- Apartment (1 bedroom) in City Centre
- Apartment (1 bedroom) Outside of Centre
- Apartment (3 bedrooms) in City Centre
- Apartment (3 bedrooms) Outside of Centre
- Price per Square Meter to Buy Apartment in City Centre
- Price per Square Meter to Buy Apartment Outside of Centre
- Average Monthly Net Salary (After Tax)
- Mortgage Interest Rate in Percentages (%), Yearly, for 20 Years Fixed-Rate

The third dataset was obtained from the Kaggle platform as well. It contains additional information about capitals and continents, also we were interested in including population measure, but this may be used in future development of the project. For more convenient further use, the second and third datasets were combined by the city attribute.

3. Infographics

3.1. Numbeo's cost of living index

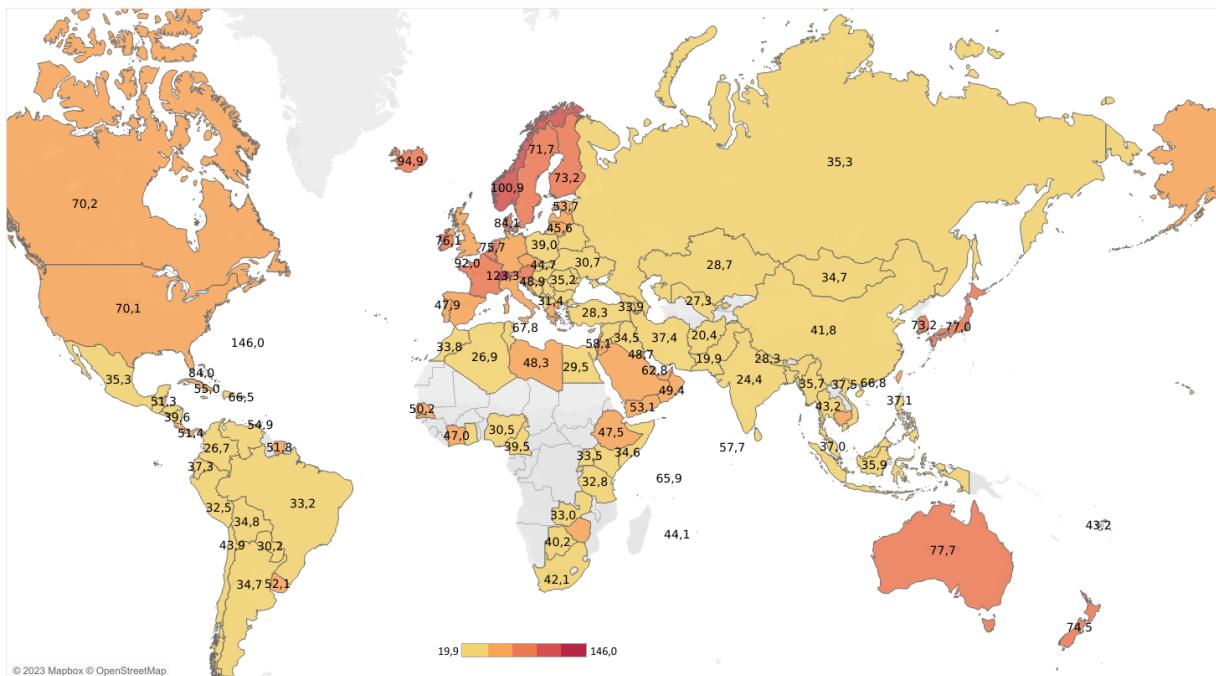


Fig. 1: Numbeo's cost of living index

On this map we can see the cost of living index for each individual country in the world. This index was pre-calculated by the web site Numbeo. In this site indices are relative to New York City (NYC). Which means that for New York City the index should be 100(%). If another city has, for example, an index of 120, it means that on an average in that city the cost of living is 20% more expensive than in New York City. If a city has an index of 70, that means the average cost of living in that city is 30% less expensive than in New York City.

It is important to note that this index does not include the cost of rent, this is indicated on the website. Nor do we know which parameters were used to calculate this index. Therefore we decided to calculate our own cost of living index, which will be based on the data from the selected dataset. We will consider this issue in more detail later.

3.2. Cost of living in the world

Top 10 countries **in Europe** with heighest cost indicator

Top 10 countries **in Europe** with lowest cost indicator

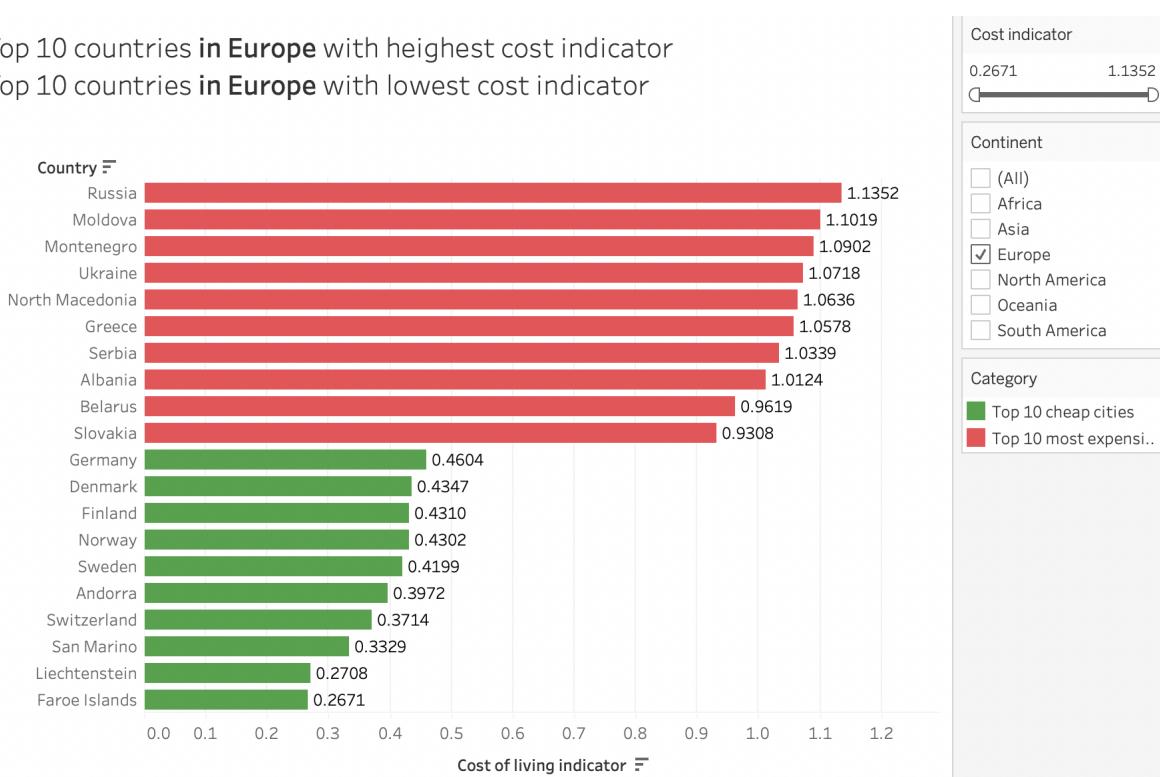


Fig. 2: Cost of living in the world (Top 10 with highest cost indicator and Top 10 with lowest cost indicator)

This visualization helps us identify the countries with the lowest and highest living standards. First of all, here you can see the top 10 countries in Europe, where the cost of living in relation to the salary is highest (red colored countries). Secondly, the top 10 countries in Europe, where the cost of living in relation to the salary is very lowest (green colored countries). It is also possible to choose another continent and see the level of indicators for other countries or around the world.

The cost of living indicator by country was used to construct this comparative graph. For the calculation of this custom indicator of the cost of living by country, we determined a very simple formula from a practical point of view and also according to the available data in the used dataset. We calculated the cost of living indicator as the sum of all minimum expenses per person per month on average across the country, which corresponds to the average salary across the country.

$$\text{Cost of living indicator} = (\text{Basic expenses} + \text{Food} + \text{Entertainment} + \text{Clothes}) / \text{AVG Monthly Salary (After Tax)},$$

where is :

Basic expenses + Food + Entertainment + Clothes =

Apartment (1 bedroom) Outside of Centre +

Monthly Pass (Regular Price) +

Internet (60 Mbps or More, Unlimited Data, Cable/ADSL) +

Basic (Electricity, Heating, Cooling, Water, Garbage) for 85m² Apartment +

Cinema, International Release, 1 Seat +

Fitness Club, Monthly Fee for 1 Adult +

Meal, Inexpensive Restaurant +

*2*Tomato (1kg) + Potato (1kg) + 2*Milk (regular), (1 liter) + 2*Loaf of Fresh White Bread (500g) + Onion (1kg) + Local Cheese (1kg) + Apples (1kg) + Oranges (1kg) + 2*Eggs (regular) (12) + 2*Chicken Fillets (1kg)]+ Beef Round (1kg) + Banana (1kg) + 10*Cappuccino (regular, in restaurants) +*

1 Summer Dress in a Chain Store (Zara, H&M...) +

1 Pair of Jeans (Levis 501 Or Similar)

This indicator of the cost of living takes a value from 0 to infinity, where 0 is the absence of expenses and full saving of the salary. Hence, the higher the indicator from 0, the more difficult it is to cover living expenses with the salary. Accordingly, the smaller the value of the indicator, the less a person spends on living per month and vice versa, the larger the value of the indicator, the larger the amount a person will spend on living per month in the corresponding city or on average in the country. If the value of the indicator is greater than 1, then a person spends more money on the listed needs than the average salary.

In view of this visualization, it can be concluded that the highest index is evident in countries with a weak economy or with long-term economic crises and high inflation. These are still the countries in the east of Europe, and at the same time the countries of the post-Soviet space. Countries with the highest indicator of living are mostly northern countries or small economically strong countries.

3.3. Cost of living in Italy

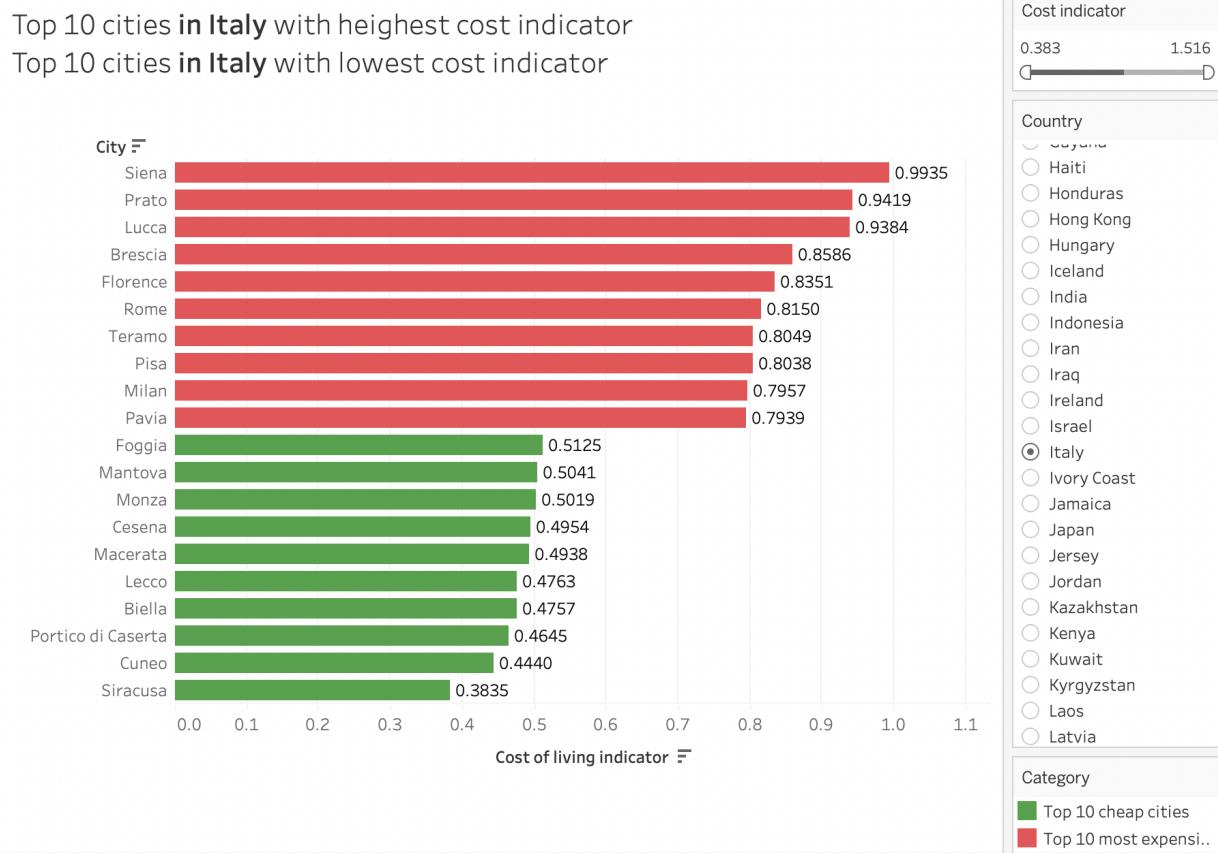


Fig. 3: Cost of living in Italy (Top 10 with highest cost indicator and Top 10 with lowest cost indicator)

On this graph, we have presented the ranking of the cities in Italy where it is cheapest and most expensive to live. For this, we used the same indicator of living expenses that was described above. It is also possible to view such a rating for the cities of any country that is available in the list.

It can be noticed that in Italy there are no cities with an index exceeding 1. It is also possible to conclude from the rating of the cheapest cities that it is better to live near big cities, because the rent is obviously lower there, but the salary is at a good level and mostly people work mainly in these nearby cities anyway.

3.4. Salary in Italy



Fig. 4: Salary in Italy

On this graph, we see the distribution of the average monthly salary by the capitals of the regions of Italy.

For this visualization, only the capitals of the regions of Italy were chosen, since it is not correct to compare all cities by the level of salary. It is obvious that a small, undeveloped city, and the further it is from a large city, has a lower level of wages.

Choosing only capitals of the regions, we would like to answer the question of where the average salary is higher and whether we see any regularities. Indeed, looking at the graph, one can conclude that the wage rate in the north is much higher. Interesting to notice that even the capital city (Rome) does not break the level of some northern capitals. This is due to the well-known fact that the north is more economically developed.

3.5. Apartment cost in Italy



Fig. 5: Apartment cost in Italy

With this data visualization we can see the ranking of rental prices for 1 room apartment outside the center.

The conclusion of the infographic is quite simple - the concentration of high rental prices directly depends on the popularity of cities and their size. So in the north in such cities as Milan and Venice, Pisa, Florence and Rimini and also in the south in Naples and along the coast in the same region the highest rent cost.

3.6. Salary VS apartment Cost in Italy

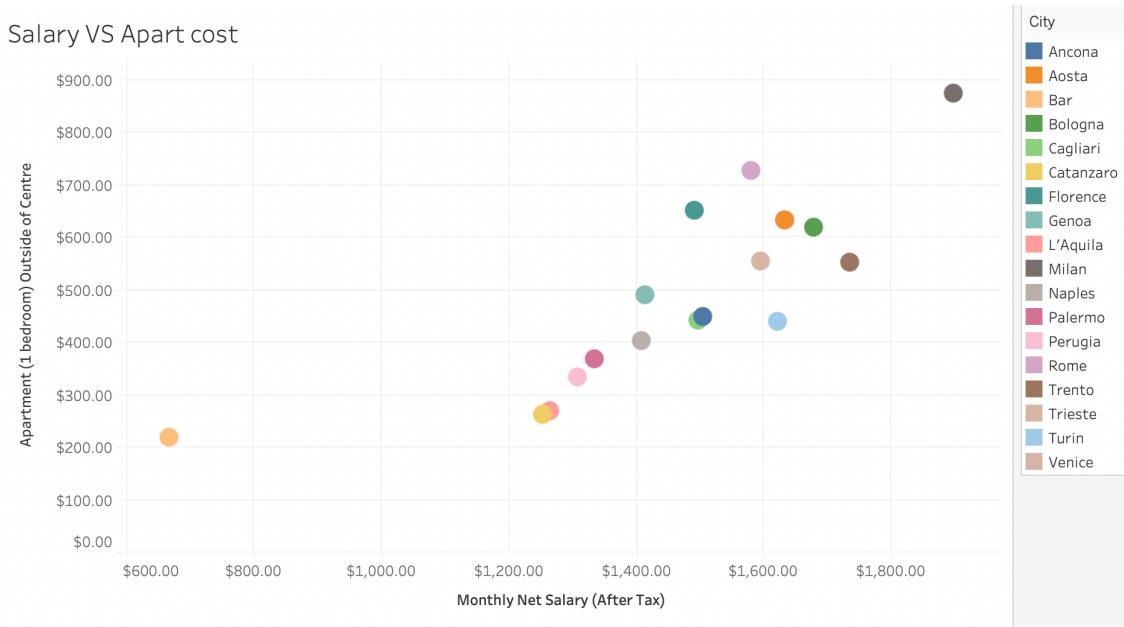


Fig. 6: Salary VS apartment cost in Italy

On this graph, we see the ratio of salary and rent of a one-room apartment in the capitals of the regions of Italy.

It is safe to note a positive correlation between these indicators, but there are some interesting observations that may be useful to the user. For example, you can single out a cluster of cities where, despite a fairly rapid increase in wages, the price of rent does not grow so quickly. These are cities such as Turin and Trento, Ancona and Cagliari, Trieste and Bologna. The second group of cities, where the rent also increases with the rapid increase in wages. These are cities like Florence, Rome and Milan. Those cities with generally the highest rent cost.

3.7. McMeal at McDonalds



Avg. McMeal at McDonalds (or Equivalent Combo Meal)

\$2.09  \$22.13

Fig. 7: McMeal at McDonalds

Comparing the prices of food products is always one of the most interesting, so we decided to look at the average cost of food around the world. It is interesting to know where to go for the cheapest Mc menu in McDonalds.

3.8. Cost of food at the market by countries

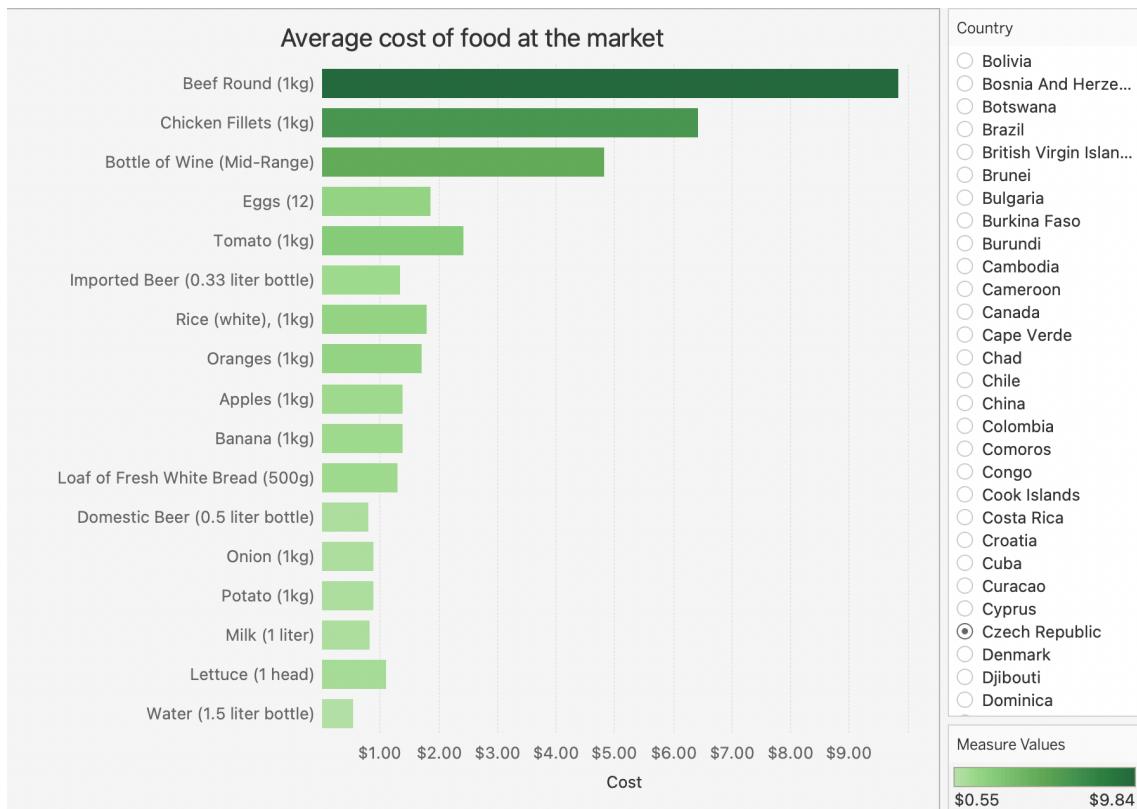


Fig. 8: Cost of food at the market by countries

According to this chart, we can see how food prices in each country of the world are related. For example, in most countries of Asia, South America and Africa, the price of a bottle of mid-level wine costs the same or more than meat. while in European countries the situation is the opposite. The price of apples is also noticeably high in African and Asian countries. This is easily explained by the fact that they have to be imported.

3.9. Comparison between beer and water

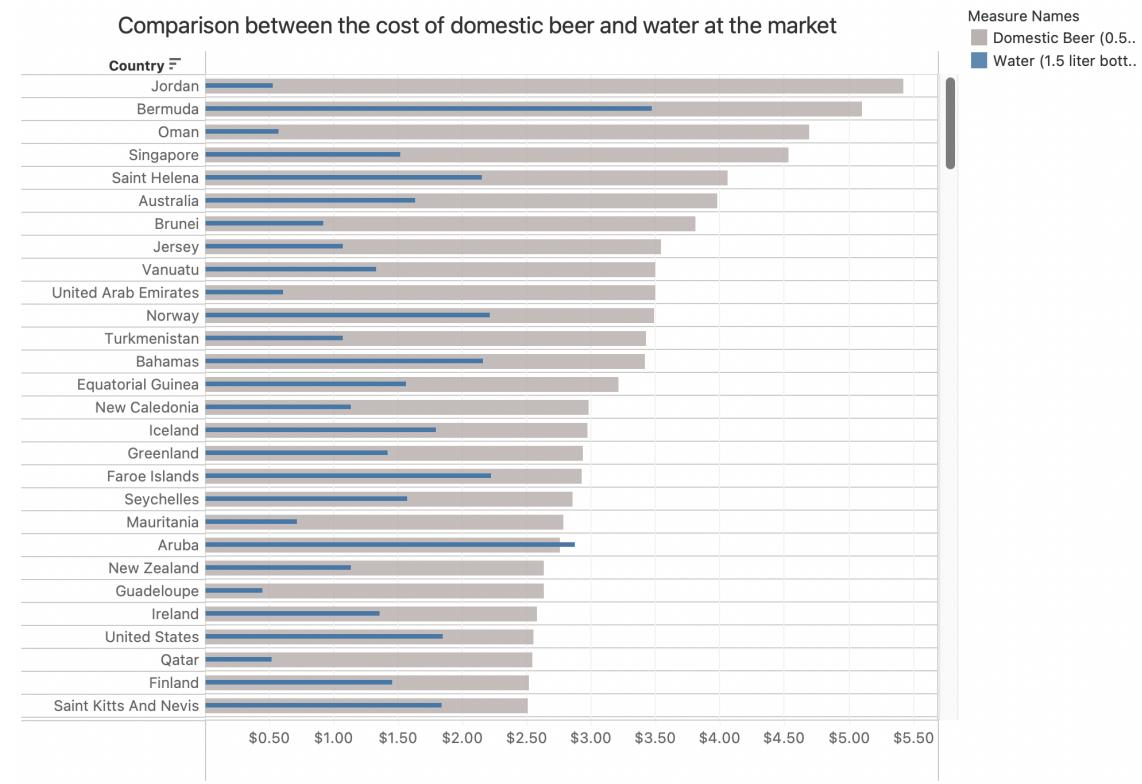


Fig. 9: Comparison between beer and water

This bar chart shows the ratio of the cost of water and beer across countries. It is interesting to know if there are countries where water is more expensive than beer. Indeed there are not many such countries, but they do exist. There are countries like Saint Vincent And The Grenadines, Aruba, Costa Rica, Sierra Leone, Eritrea, Panama, Yemen, Benin, Somalia.

3.10. Transport comparison across the world

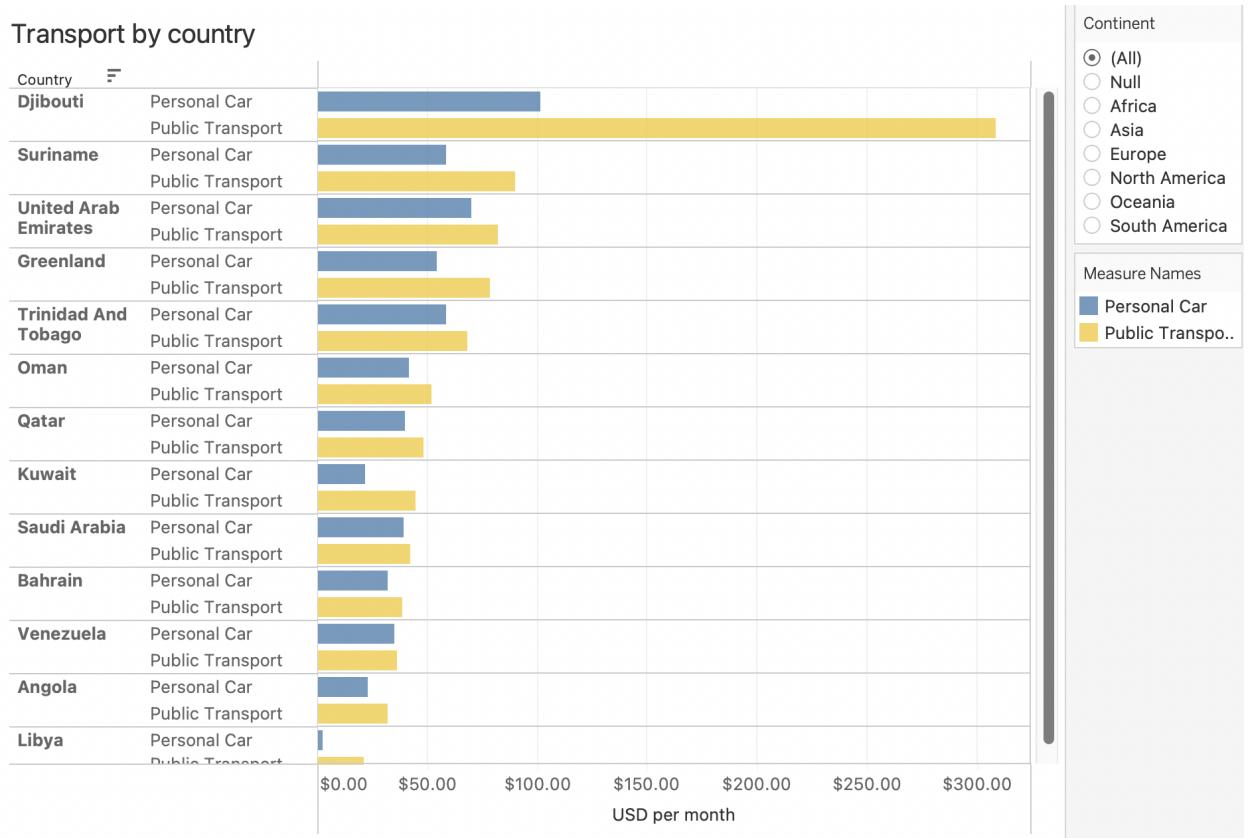


Fig. 10: Transport comparison by country

This visualization makes it possible to answer the question, which countries have the least developed public transport. This visual representation of the data will help identify these countries, because countries with poor public transport usually also have a very high cost of using this public transport. Therefore, in such situations, people mostly use their own cars, which is more convenient and profitable. There are relatively few such countries and they are mostly located in Asia, Africa and South America. But it is worth noting that countries such as the USA and Canada also have bad public transport in some areas, so it is also interesting to look at each country separately.

3.11. Transport by city

❖ *Canada*

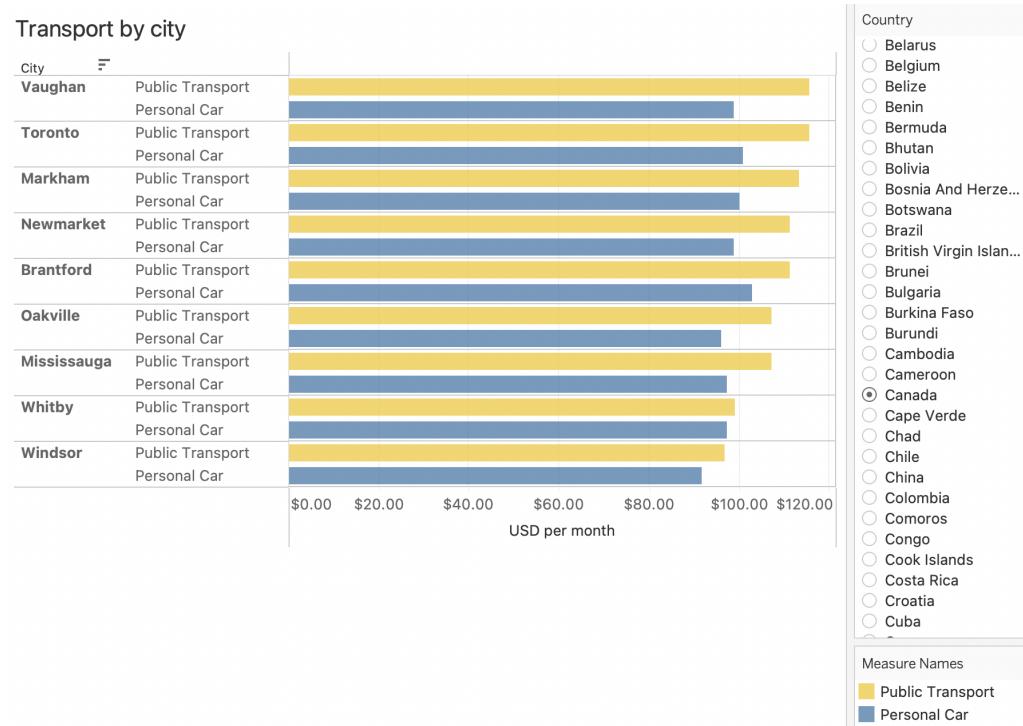


Fig. 11: Transport comparison Canada

On this graph, we see a comparison of the cost of monthly use of a private car (already available) and a monthly pass for public transport. Our goal is to identify cities in countries where using your own car is more profitable.

We see that in many Canadian cities it is more convenient and profitable to use your own car.

❖ United States

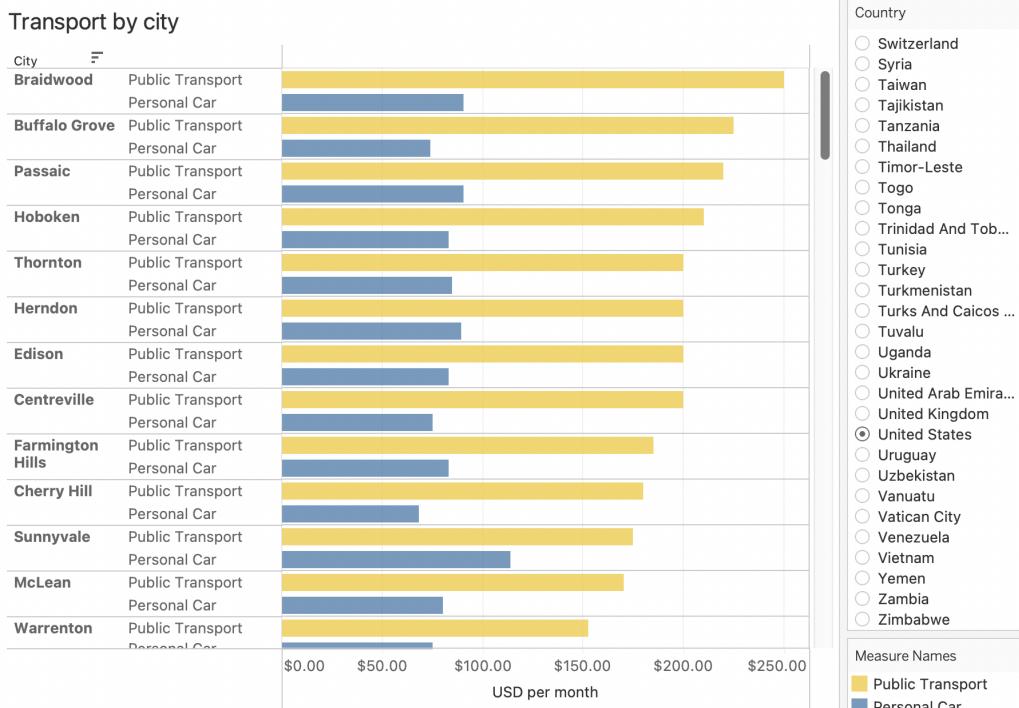


Fig. 12: Transport comparison United States

In the USA, a really large number of cities require having their own car for comfortable movement in the area.

❖ United Kingdom



Fig. 13: Transport comparison United Kingdom

On this graph you can see an example of a European country. In the United Kingdom there are also cities where the use of public transport is more expensive. In the vast majority of other European countries it is cheaper to use public transport.

3.12. Education

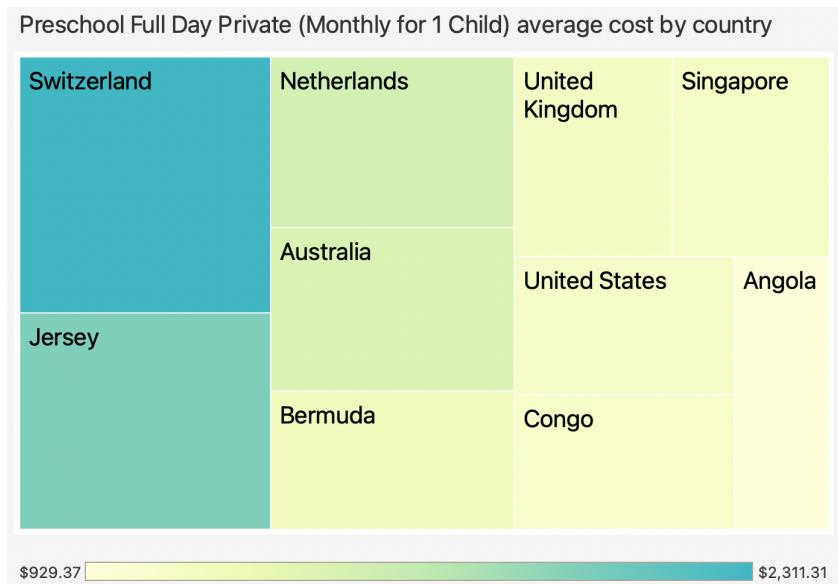


Fig. 14: Preschool (Top 10 with highest cost)

This chart clearly shows the top 10 countries with the most expensive preschool education.

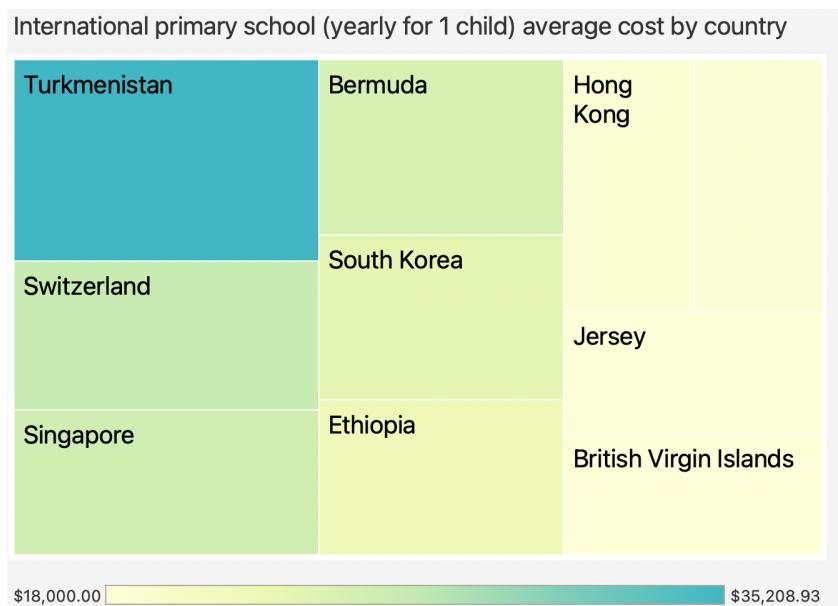


Fig. 15: International primary school (Top 10 with highest cost)

The presentation of the cost of one month at an international primary school has changed somehow. Of course, the price for studying in a regular local school of a good level will cost less, but we do not have such data in the dataset.

4. Quality assessment

An infographic can be evaluated on several levels:

- **Qualitative - Quantitative:** these evaluations are characterized respectively by a heuristic evaluation with a psychometric questionnaire and a user test. The output of a heuristic evaluation is a list of usability problems, that is a list of opportunities to improve the data viz
- **Absolute - Comparative:** an absolute evaluation determines if an infographic is “good”; a comparative evaluation compares two or more infographics to see if there is a significant difference and choose which one is better.
- **Formative - Summative:** the formative evaluation is done at the conclusion of the development phase to determine whether the dataviz satisfies all needs and expectations that were gathered at the beginning.

4.1. Users

The infographic must be consistent with the user's expectations, it has to put him at ease with simple but at the same time complete elements. It must not contain elements of confusion or that lead to some kinds of mistakes. It also aims to lead the user to ask himself questions and to solve them through it. To balance the cost of the operation and on the other side its effective accuracy, we decided to involve for our evaluation of the infographic a number of 24 users.

4.2. Heuristic Evaluation

Heuristic evaluation is a usability engineering method for identifying usability issues in user interface designs so they can be fixed as part of an iterative design process. A small group of evaluators will examine the infographics and determine whether it complies with accepted usability principles (referred to as "heuristics") through heuristic evaluation. The Heuristic evaluation that we designed consists of nine different tasks. Users

will have to perform these tasks, which will be mostly questions, and at the same time “think aloud” to give us the opportunity to take note of any problems with infographics, but also take action in case of a request for help. During each task, the execution time will be recorded.

4.2.1. Our tasks

Below are the 9 tasks that we have identified:

1. **Global cost of living (1):** can you tell me which are the continents where the cost of living is lower?
2. **Global cost of living (2):** identify the best and worst countries in terms of living standards.
3. **Cost of living in Italy:** Identify the best and worst cities in terms of living standards.
4. **Salary in italy:** Determine in which cities the average salary is higher.
5. **Salary VS Apartment cost:** Look at the chart Salary VS Apartment cost and identify which city would you choose to live in?
6. **Food:** You want to spend as little as possible at McDonald's, where do you go? And what is the average cost of one kilo of tomatoes in Hungary?
7. **Beer VS water:** Can you spot any country where the cost of water exceeds the cost of beer by at least \$1?
8. **Transport by country:** identify countries with globally underdeveloped public transport.
9. **Transport by city:** identify cities in Canada and the United Kingdom where monthly use of a private car (already available) is cheaper than the monthly use of public transport?

4.3. Psychometric questionnaire

For the realization of the psychometric questionnaire we decided to adopt the Cabitza-Locoro scale, and then to conclude it with a final request for an overall evaluation of the whole infographic. This scale allows the assessment of the quality of the infographic on a scale of 1 to 6 for the following four fields:

- Utility
- Clarity
- Informativeness
- Beauty

Evaluate the quality of the infographic below by giving a score from 1 (very little) to 6 (very much) to each of the following adjectives. *						
	1	2	3	4	5	6
Useful	<input type="radio"/>					
Clear	<input type="radio"/>					
Informative	<input type="radio"/>					
Nice	<input type="radio"/>					
Finally evaluate the infographic indicating a total quality value you perceived.						
	1	2	3	4	5	6
Total value	<input type="radio"/>					

Fig 16: The Cabitza-Locoro scale in our google form

4.4. Results

This section will report all the results obtained during the evaluation phases of the infographics and the psychometric questionnaire.

4.4.1. Heuristic test

For this test we involved 3 different users and the purpose of this test is evaluating the work done so far with a “think aloud” protocol, taking into account all the problems encountered by the users throughout the navigation between the infographics and expressed aloud, from which we can be able to figure out how to improve our work.

User 1	In general, everything is clear and appropriate. The main remarks are the absence of a legend and a data scale in some visualizations (Apartment cost in Italy, Comparison between beer and water)
User 2	Lack of descriptions for visualizations, which are indicators, how they were calculated and what their reference values are (Numbeo's cost of living index)
User 3	Everything is clear and clear, but also the main remarks are the absence of a legend and a data scale in some visualizations (Apartment cost in Italy, Comparison between beer and water)

After receiving all the comments, the visualizations about which there were complaints have been changed. The report shows the already fixed versions of visualizations. Changes related to selection of colors for "Apartment cost in Italy" visualization, addition of legends where they were missing. Additional information was also added to the dashboard, which was critically important for users.

4.4.2. Heuristic evaluation

For the heuristic evaluation we asked for the participation of 6 users, who performed the tasks mentioned above. Each user has the dashboard available, where he is free to navigate and for each chart is presented the task on a sheet.

For each user, we asked them to provide us with the following personal data: gender, age (to select from age groups), level of familiarity with the topic (to choose between three options; beginner, average expert and full expert) and education level.

ID	Sex	Experience level	Age	Education level
User 1	M	Average expert	18-25	Master degree
User 2	F	Beginner	18-25	Higher diploma
User 3	F	Beginner	18-25	Master degree
User 4	M	Average	18-25	Higher

		expert		diploma
User 5	M	Beginner	36-50	Master degree
User 6	F	Beginner	51-65	Higher diploma

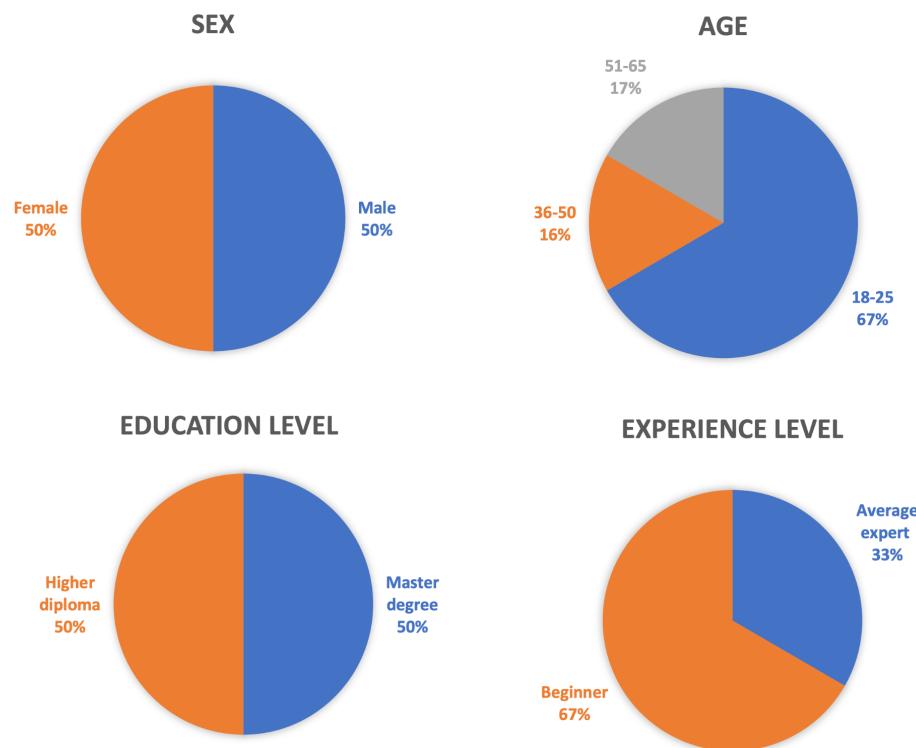


Fig 17: Analysis of the sample interviewed

The table of heuristic evaluation results given below.

Task	ID	Execution time (s)	Execution modality*
Task 1	User 1	70	C
	User 2	72	C
	User 3	74	C
	User 4	15	C
	User 5	25	C
	User 6	50	C
Task 2	User 1	32	C
	User 2	30	C

Task 3	User 3	43	C
	User 4	12	C
	User 5	20	C
	User 6	23	C
	User 1	36	C
	User 2	23	C
Task 4	User 3	34	C
	User 4	15	C
	User 5	20	C
	User 6	17	C
	User 1	33	C
	User 2	34	C
Task 5	User 3	35	C
	User 4	21	C
	User 5	31	C
	User 6	29	C
	User 1	38	C
	User 2	56	C
Task 6	User 3	72	C
	User 4	25	C
	User 5	40	C
	User 6	32	C
	User 1	48	C
	User 2	84	C-A
Task 7	User 3	73	C
	User 4	60	C
	User 5	71	C
	User 6	78	C-A
	User 1	60	C

	User 2	46	C
	User 3	55	C
	User 4	28	C
	User 5	35	C
	User 6	52	C-A
	User 1	56	C
Task 8	User 2	43	C
	User 3	68	C-A
	User 4	30	C
	User 5	45	C-A
	User 6	62	C
	User 1	91	C
Task 9	User 2	113	C-A
	User 3	101	C
	User 4	102	C
	User 5	105	C
	User 6	120	C-A

* In the context of the execution modality, C stands for “correct” and W for “wrong” and A for “assisted”.

The task resolutions registered as “assisted” are obviously the ones characterized by any kind of help or explanation both on the graph and on the question’s meaning.

Now we have collected the reasons behind the problems for each task. Despite this, users did not have any errors.

Task	Description of problems
Task 6	Users wanted a hint about the feasibility of using value sorting to get the correct answer faster
Task 7	At first glance the user could not find the cost of water
Task 8	A hint was needed to the meaning of the question. It was not

	obvious to the user how to correlate the fact given in the question with the data presented in the visualization.
Task 9	Users wanted a hint about the feasibility of using measure value sorting to get the correct answer faster

Graphical presentation of heuristic test results.

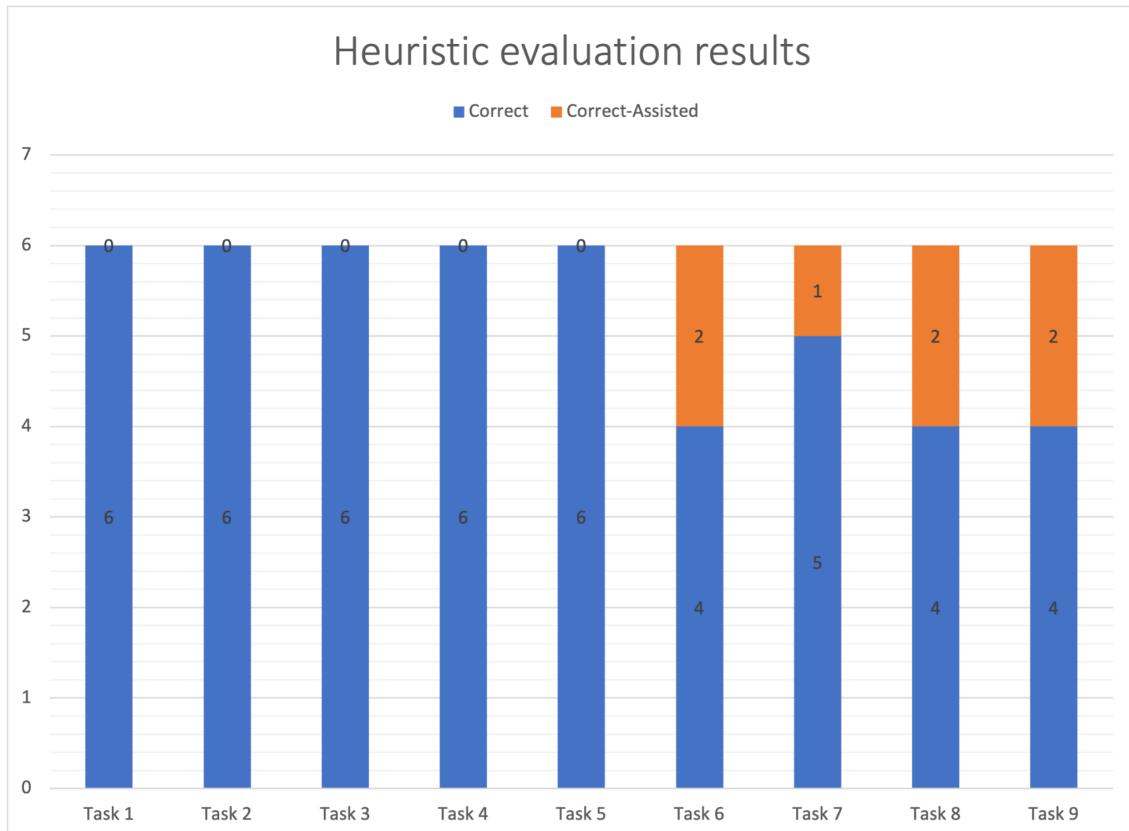


Fig 18: Analysis of the heuristic evaluation results

After having analyzed all the kinds of problems that occurred, we proceeded by taking in consideration the execution time for each task. To do so, we created a violin plot, aiming to immediately have clear the variation of the execution times in carrying out the tasks.

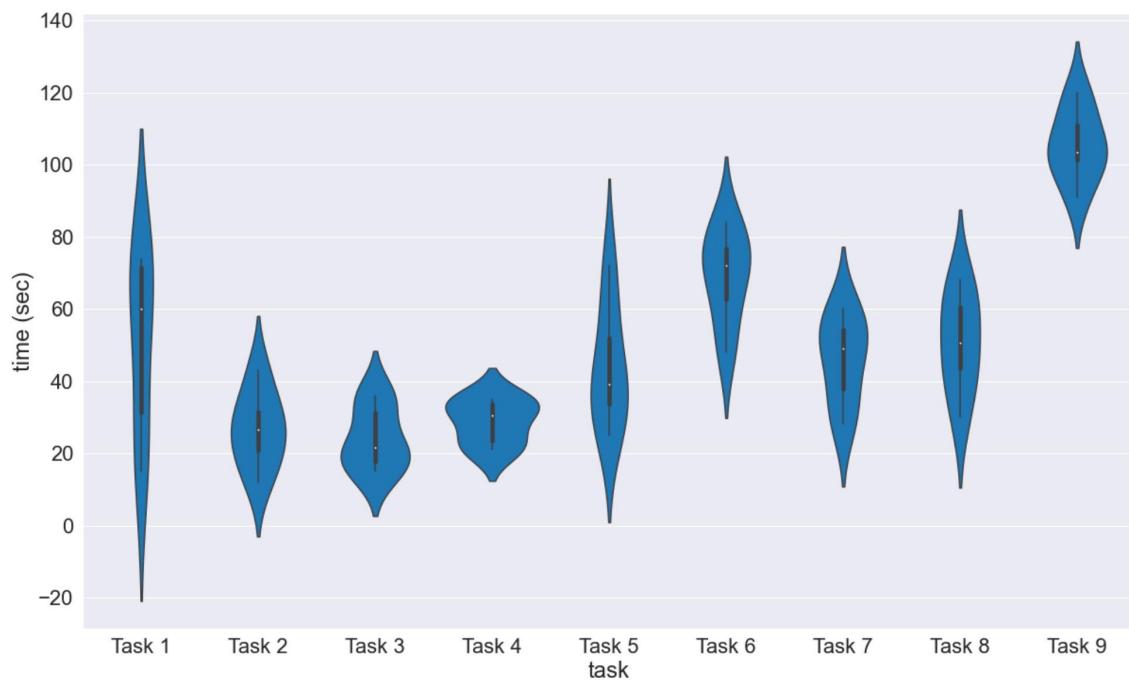


Fig 19: Analysis of the time taken by the respondents to carry out the tasks with the Violin Plot chart

Looking at these plots, we can instantly notice that the execution time regarding tasks 2, 3, 4 are relatively low, or at least lower than the others. There's probably a correlation with the fact that tasks 2, 3, 4 are also the ones for which no problems occurred, while regarding the task that was found to be the most rather complex than difficult (tasks 9) time is more heterogeneous and tends to be higher.

4.4.3. Psychometric questionnaire

In conclusion, we provided the psychometric questionnaire with the Cabitza-Locoro scale to 24 users. Below are the analyses of the data collected. The statistics of all adjectives are shown first.

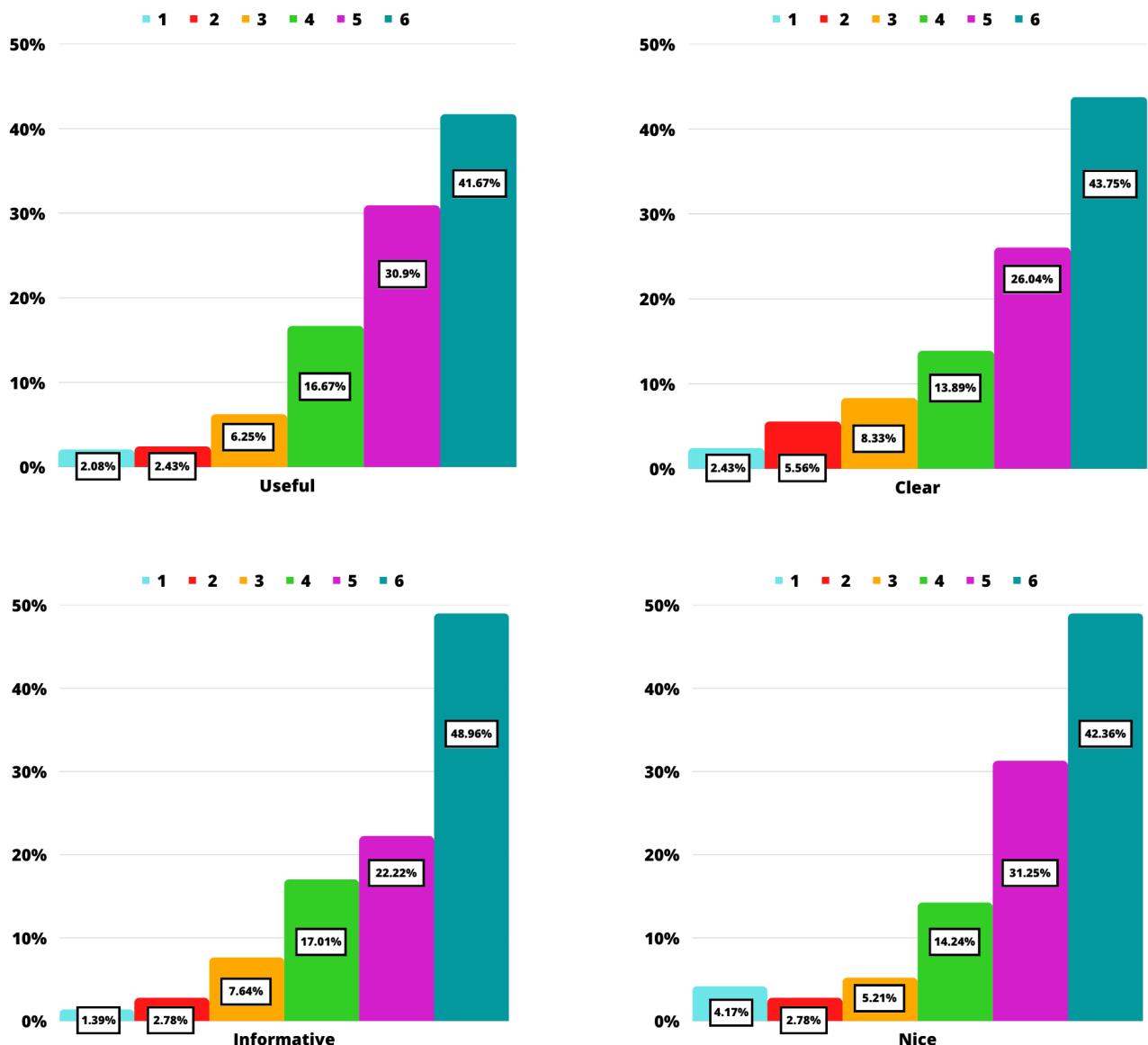


Fig 20: Data collected about adjectives with the Psychometric Questionnaire

From these charts we can see that the informative and clear level of our charts is very high. Overall, our surveyed users found our graphs useful and nice.

Below we report the statistics about the total value of quality:

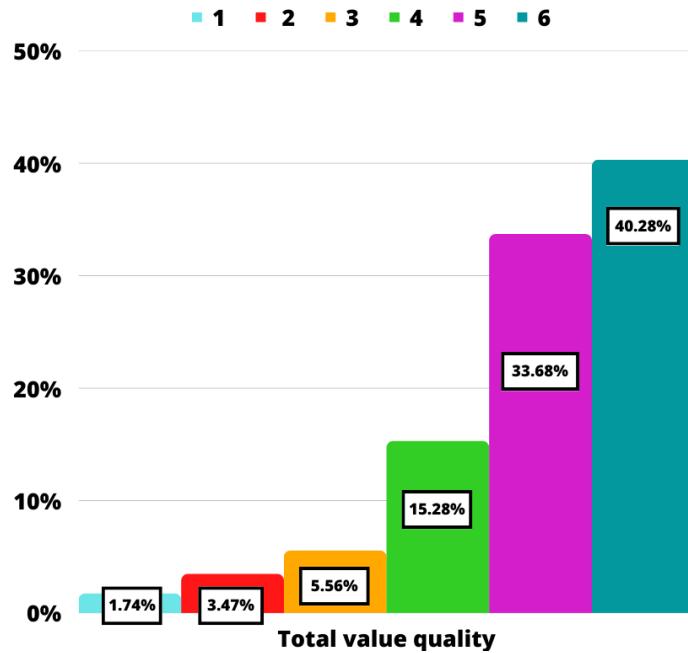


Fig 21: Data collected about total value quality with the Psychometric Questionnaire

And finally we present the stacked bar chart to highlight the percentage of positive ratings for each chart, compared to negative judgements:

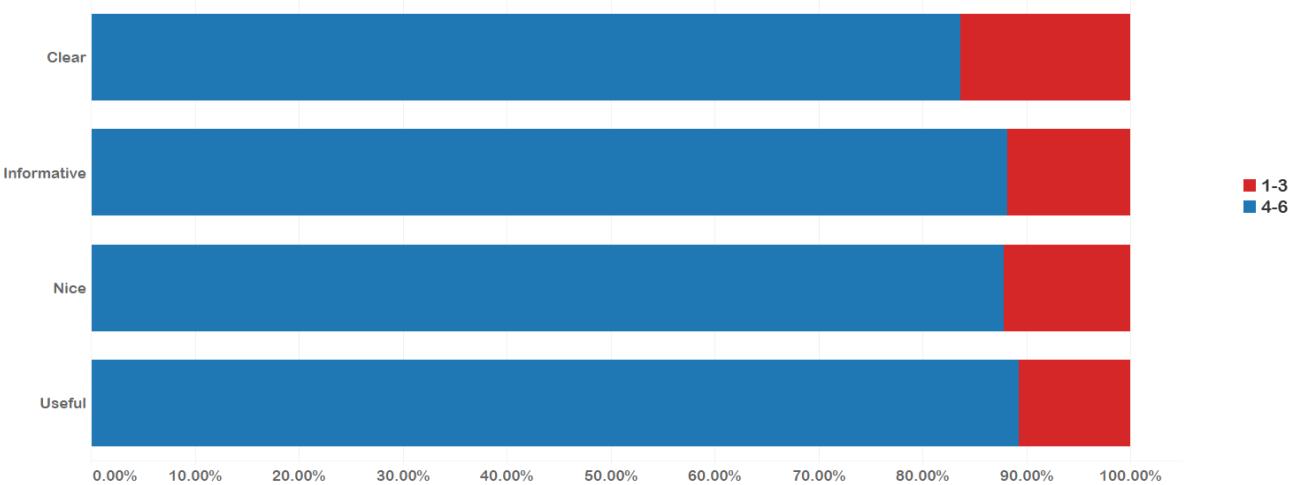


Fig 22: Stacked bar chart for the data collected with the Psychometric Questionnaire

As we can see from the graph the values from 4-6 for all four characteristics are close to 90%, so in conclusion we can be satisfied with the results obtained.

5. Conclusion and future developments

The chosen topic is very complex and diverse in terms of its visualization possibilities. The main aspects of a person's life and the amount of expenses for these areas of life were clarified: transport, housing, salary, food. We tried to collect the optimal set of presentations of relevant data for the user to obtain the general situation in the world and in more detail by country and city. We also introduced our cost of living indicator based on the data available to us. The covered topic was not easy, as the calculation of the cost of living in each city can change in a short period but it remains a very interesting and useful topic to better understand the realities that surround us. Through our project we analyzed some variables that we were particularly interested in, but developing a research towards other variables could be one of our future developments, for example the average cost of daily activities or shopping.

After conducting various tests with users directly, we received positive evaluations and feedback, but also comments that were taken into account and improved data visualization.

With regard to further research, it is possible to go in the economic direction, that is, to make the visualization more economically justified, to investigate this area in detail. It is also possible to supplement the datasets with other data from reliable sources, for example, on the population or incomes (not wages), including relevant economic indicators of well-being. On the other hand, it is possible to work on the existing dataset, carry out its restructuring, because currently its structure rather limits the possibilities of building various visual representations and we have to reject many ideas.