

Data Visualisation

COS30045

[PROJECT TOPIC]

Fabian Sigmund 105015135

Vasudevan Karthikeyan 14085344

Tutor: Afzal Azeem Chowdhary

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1. Introduction

1.1 Background and Motivation

The Concept of Life expectancy is a well-regarded subject by health authorities, governments, social services, and other interested parties. The notion of a person's expected life span being determined by specific environmental variables is of fascination. The subject is of relevance in the assessment of measuring the growth and development of countries. The gap between life expectancies of developed nations in Europe, to under-developed countries in Africa, have been instrumental in such countries earning the status of a "Third-world nation."

1.2 Visualisation Purpose

The lower life expectancies of such countries are determined by their lack of health care, violence, poverty and multiple other factors. However, some factors play a significant role more than others. The purpose of showcasing of validating or disproving any pre-determined notions, regarding life expectancy, is the motivation behind our visualisation.

2. Data

2.1 Data Source

The primary data source for the visualization is the life expectancy table from the OECD Health Statistics, accessible via the following link: [OECD Data Explorer • Health status](#).

	Time period	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Reference area																			
Sex: Total																			
Austria		68.7	69.7	69.4	69.6	70	69.8	70.2	70	70.2	69.9	70.1	70.3	70.7	71.2	71.2	71.4	71.8	72.2
Canada																			
Chile		E 57.3	E 57.7	E 58.1	E 58.6	E 59	E 59.5	E 60	E 60.6	E 61.1	E 61.7	E 62.3	E 63	E 63.6	E 64.3	E 65	E 65.7	E 66.4	E 67.1
Colombia		55.2	55.6	56.1	56.5	56.9	57.3	57.8	58.2	58.7	59.1	59.5	59.9	60.3	60.7	61.1	61.5	62	62.5
Costa Rica		60.4	61	61.6	62.2	62.8	63.3	63.9	64.4	64.8	65.3	65.8	66.4	66.9	67.5	68.2	68.8	69.5	70.2
Czechia		70.7	70.7	70	70.5	70.7	70.4	70.6	70.5	70	69.6	69.6	69.8	70.3	70.1	70.2	70.5	70.7	70.7
Denmark		72.4							72.6	73	73.2	73.3	73.3	73.4	73.6	73.9	74.2	73.8	74.7
France		70.3	71	70.5	70.5	71.4	71.3	71.5	71.5	71.3	72.2	72.1	72.4	72.5	72.8	73	73.2	73.8	
Germany		69.1	69.7	69.9	70	70.6	70.5	70.6	70.9	70.5	70.3	70.6	70.8	71	71.3	71.5	71.4	71.8	72.5
Greece			72.1	71.7	72	71.8	72.4	72.6	72.4	72.4	73	73.8	74.2	73.8	74.1	74.6	74.4	74.5	74.7
Hungary		68.1	69	67.9	69	69.5	69.2	69.9	69.5	69.3	69.4	69.2	69.1	69.8	69.6	69.3	69.4	69.7	69.9
Iceland			73.5	73.7	73	73.5	73.8	73.3	73.8	74	73.7	73.8	73.5	74.4	74.4	74.4	75.5	76.9	76.3
Italy			69.8										72			72.6	72.7	72.8	73.4

Figure 1: Life Expectancy Table of the OECD Health Statistics

Figure 1 displays a table that outlines the life expectancy in various countries from 1960 to 2022. It measures life expectancy in years and provides separate sections for women, men, and the overall population.

An indicator of life expectancy is the gross domestic product (GDP). The following table was retrieved from the OECD Economy Statistics, accessible via the following link: [OECD Data Explorer • NAAG Chapter 1: GDP](#)

	Time period	1970	1971	1972	1973	1974	1975	1976	1977
Reference area									
Combined unit of measure: US dollars, PPP converted, Billions, Current prices									
Australia		58.91	64.19	69.87	78.91	86.39	96.93	104.37	110.36
Austria		E 28.57	E 31.56	E 34.97	E 38.68	E 43.83	E 47.71	E 52.64	E 58.76
Belgium		E 37.28	E 40.64	E 44.63	E 49.96	E 56.74	E 61.17	E 68.19	E 72.88
Canada		99.26	108.49	119.42	134.44	151.46	168.05	187.74	206.45
Chile									
Colombia							E 33.21	E 36.66	E 40.57
Costa Rica									
Czechia									
Denmark		20.96	22.69	24.60	27.01	29.11	31.34	35.03	37.90
Estonia									
Finland		E 15.57	E 16.75	E 18.82	E 21.24	E 23.90	E 26.59	E 28.15	E 29.97
France		191.73	212.16	231.32	259.47	294.98	319.21	351.45	386.22
Germany		E 314.13	E 340.40	E 370.38	E 409.34	E 450.15	E 487.58	E 539.88	E 592.61
Greece		E 27.51	E 31.17	E 35.83	E 40.85	E 41.66	E 48.41	E 54.58	E 59.67
Hungary									
Iceland		E 0.79	E 0.93	E 1.04	E 1.17	E 1.34	E 1.48	E 1.65	E 1.91
Ireland		E 7.25	E 7.88	E 8.75	E 9.67	E 10.99	E 12.69	E 13.57	E 15.60
Israel									E 23.25
Italy		E 195.36	E 208.99	E 226.07	E 255.45	E 293.76	E 314.26	E 355.17	E 386.90
Japan		E 348.11	E 382.95	E 433.11	E 493.54	E 531.37	E 598.53	E 656.57	E 727.99
Korea		19.36	22.49	25.15	30.48	36.39	42.87	51.21	61.11
Latvia									

Figure 2: Gross Domestic Product of the OECD Economy Statistics

2.2 Data Processing

Many of the tables lack data points for certain years, which could pose a challenge when utilizing this data for visualization purposes.

//TODO

3. Visualisation Design

The choice of visualisation suitable for expressing as much information as possible was a challenge. Life Expectancy of a country corresponds to multiple facets of a nation's infrastructure ranging from GDP to quality health services. Additionally, it was our intention to highlight the growth or decline of certain OECD countries over a period. Therefore, a visualisation capable of displaying time-series data was required.

Design 1 – Line graph

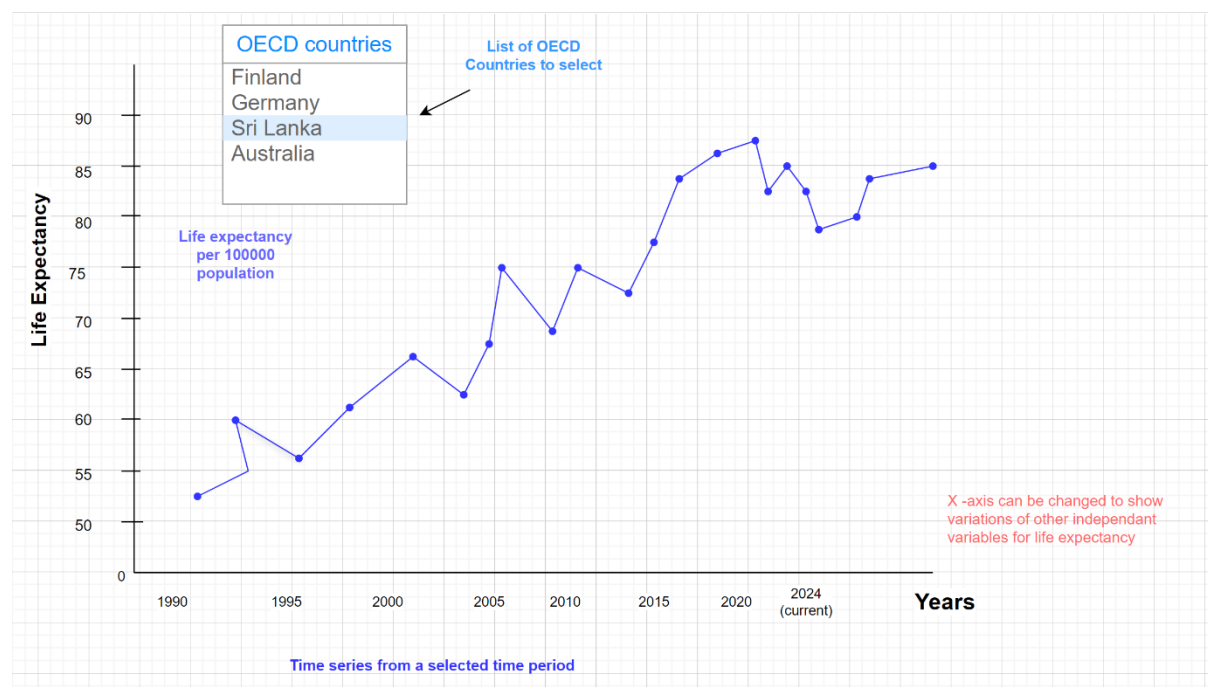


Figure 3: Sketch 1 – Line graph

A line chart was the initial chart thought of when considering a time series. The above sketch illustrates a chart plotting Life Expectancy vs time. Line charts employ the positioning on the common scale as a channel to encode the trend of its variables. The sketch shows that chart can be altered through a drop-down list, to highlight the trend of life expectancy in different countries.

However, it was evident that the visualisation and design was too simplistic and uninteresting to proceed with. Despite its expressiveness with time, line charts are limited to the amount of information it can hold. Our intention was to create visualisation which can highlight different variations of life expectancy with different varieties of datasets. Therefore, a different approach was needed.

Design 2 – Heat Map

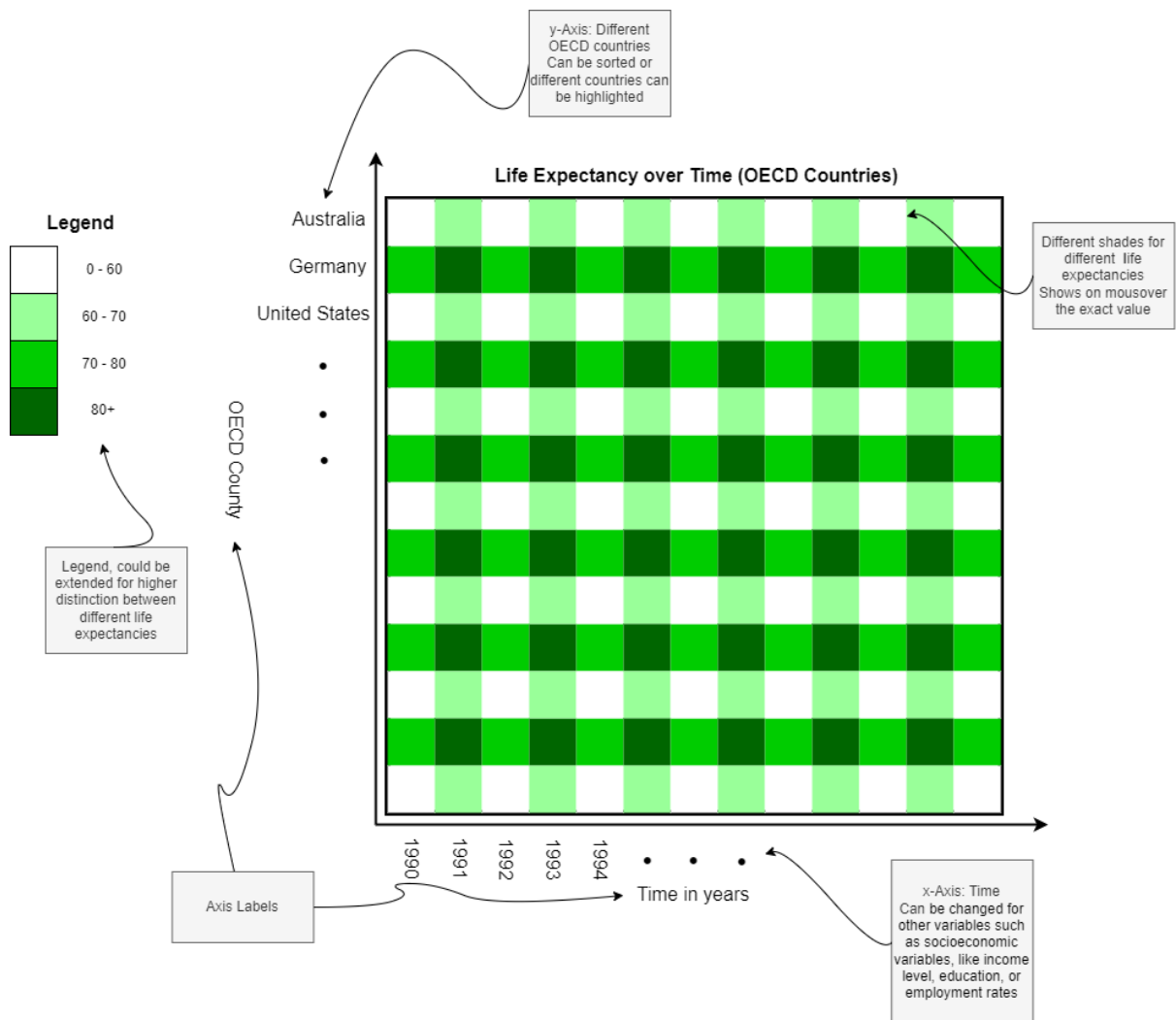


Figure 4: Sketch 2 – Heat Map

The second approach was a heat map. This design could encode the data of multiple OECD countries, in the same chart, without the need for transitions or updates. The time series aspect is encoded as well, like the line graph, but the channel used to encode life expectancy has been changed to colour saturation. A legend is used as reference to the ranges of life expectancy which have been sorted to 4 bins and colour coded.

This design is expected to highlight selected countries and expand the legend though to display further insights. Hence this chart design is very interactive, compared to the previous one. This design was successful in its ability to compare

the life expectancies of multiple OECD countries over a period, but it is still short of the ideal visualisation, which can encode different facets of information.

Design 3 – Bubble chart

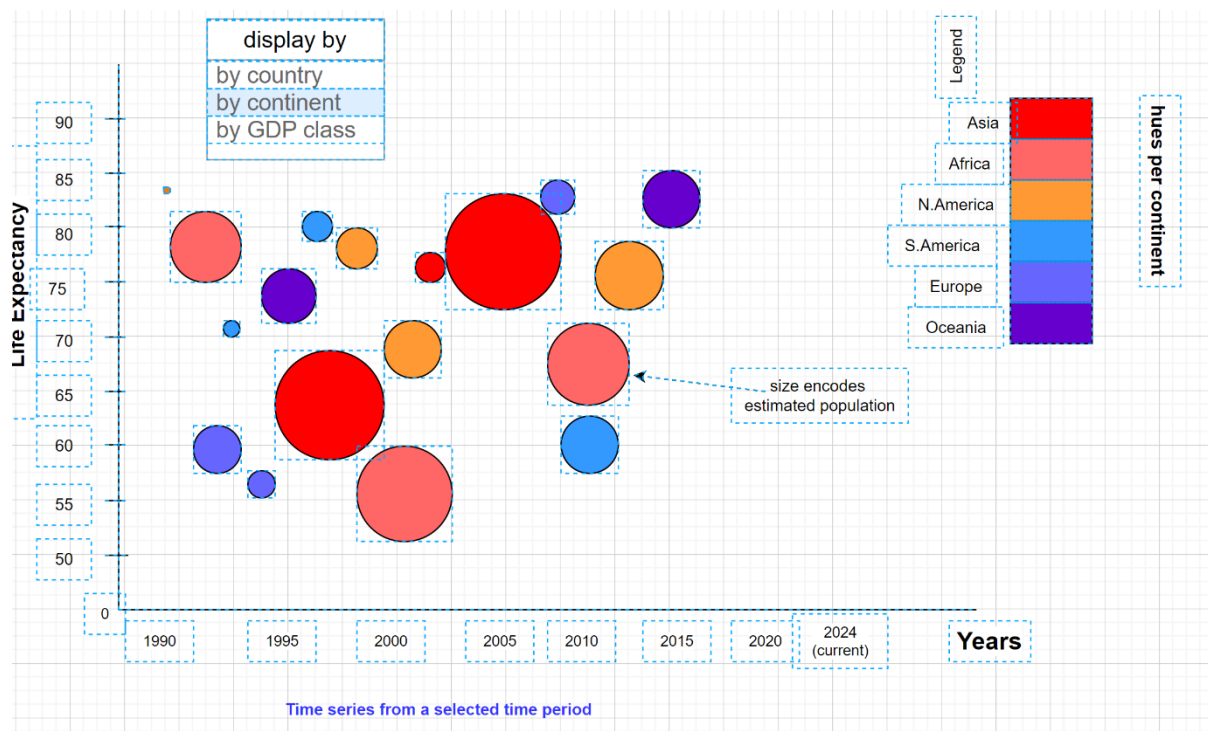


Figure 5: Sketch 3 – Bubble chart

This design encapsulates the successes of both previous designs. The OECD countries are represented by bubbles (mark) and visual encoding has been changes the distinct colour hues to distinguish the qualitative data and the spatial positioning to denote the quantitative data (life expectancy). The different hues are labelled in a legend.

The chart uses the transitioning and updating features of design 1 but is not simplistic or limited. The above design shows the variations of life expectancies in the major regions of the world, but both the chart and legend can be changed to show individual countries or countries categorised based on GDP and many more.

The size of bubbles is an additional magnitude channel to be used to encode data, the above sketch shows it encoded for human population in the region, but it can be used to encode other factors such as magnitude of health spending, mortality rate or average GDP.

4. Validation

5. Conclusion

6. References

Notes:

- Week07:
 - Initial idea is to find correlations between mental health and various indicators such as GDP, access to doctors etc.
- Week08:
 - Shift the project topic, because there are no primary databases on mental health status
 - Inspiration: Ted Talk
https://www.ted.com/talks/hans_rosling_the_best_stats_you_ve_ever_seen?language=en
 - We shifted the topic to “Health status” to be more flexible.

Life expectancy: [https://data-explorer.oecd.org/vis?fs\[0\]=Topic%2C0%7CHealth%23HEA%23&fs\[1\]=Topic%2C1%7CHealth%23HEA%23%7CHealth%20status%23HEA_STA%23&pg=0&fc=Topic&snb=16&df\[ds\]=dsDisseminateFinalDMZ&df\[id\]=DSD_HEALTH_STAT%40DF_HEALTH_STATUS&df\[ag\]=OECD.ELS.HD&df\[vs\]=1.0&pd=%2C&dq=.A.LFEXP.Y.Y0.....&ly\[rw\]=REF_AREA&ly\[cl\]=TIME_PERIOD&ly\[rs\]=SEX&to\[TIME_PERIOD\]=false&vw=tb](https://data-explorer.oecd.org/vis?fs[0]=Topic%2C0%7CHealth%23HEA%23&fs[1]=Topic%2C1%7CHealth%23HEA%23%7CHealth%20status%23HEA_STA%23&pg=0&fc=Topic&snb=16&df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_HEALTH_STAT%40DF_HEALTH_STATUS&df[ag]=OECD.ELS.HD&df[vs]=1.0&pd=%2C&dq=.A.LFEXP.Y.Y0.....&ly[rw]=REF_AREA&ly[cl]=TIME_PERIOD&ly[rs]=SEX&to[TIME_PERIOD]=false&vw=tb)

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