Developing sustainable economies through gender parity

A report for the United Nations ESCAP by Bethany Koulyras (bkou2095), Benjamin Fleming (bfle6726) and Nathan Judges (njud0858).

Advancing women's equality in work and society represents one of the most sizeable economic opportunities for the world. Trying to grow economies without enabling the full potential of women is like fighting with one hand tied behind one's back.

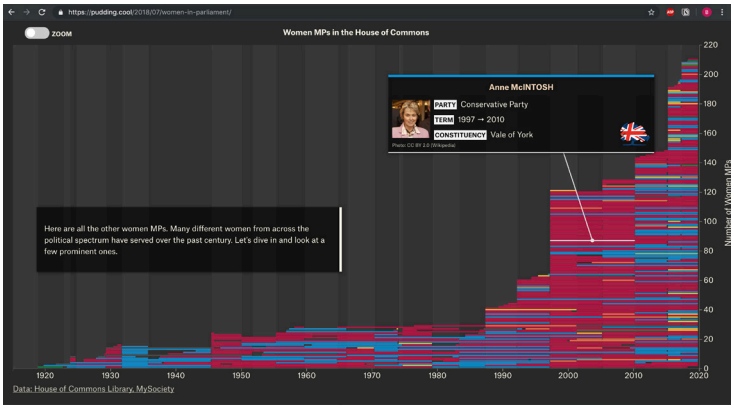
Introduction

Advancing womens equality in work and society represents one of the most sizeable economic opportunities in the world. Trying to grow without enabling the full potential of women is like fighting with one hand tied behind ones back. Our prior visualisations focused on the quantitative aspects of gendered economics - zooming in on the affect of equality factors like health and education had on overall GDP and political empowerment. We were unsure of wether to zoom in or out - focus on more countries or details granularly or on whole region datasets. From the outset we aimed all our works to gel together as a cohesive, compelling whole, a suite of visualisations about gender parity in the Asia Pacific. As we'd covered more numerical leaning aspects, our focus shifted to the qualitative.

Discovery

Initially we were set on a narrative driven visualisation and set out on exploring how we'd approach that. After discussing the data we already had and what we'd learnt about the space, it was decided that instead of talking about women in the abstract as a group - why not focus on singular women and tell their stories. In our thinking we couldn't name even two exemplary women from outside Australia who had changed the status of women.

After researching multiple online interactive d3 visualisations, we decided upon a timeline format as best to tell a story. The long form, scroll to interact storytelling on https://pudding.cool told stories in a compelling, aesthetically enrapturing way, allowing users to consume data in a guided, article-esque format. They formed the basis of our narrative work moving forward.



We could introduce these women to our audiences through data and their stories - contrasting storied events like India's 1940 Forum Against Rape and the data on still epidemic sexual violence occurring in India today. Each of us individually plotted out 10 exemplary women who fought for womens liberation per decade since the 1940's (the earliest decade of available digital data) to then par back into a digital story.

Feminist Activism Movements

1950 - Now

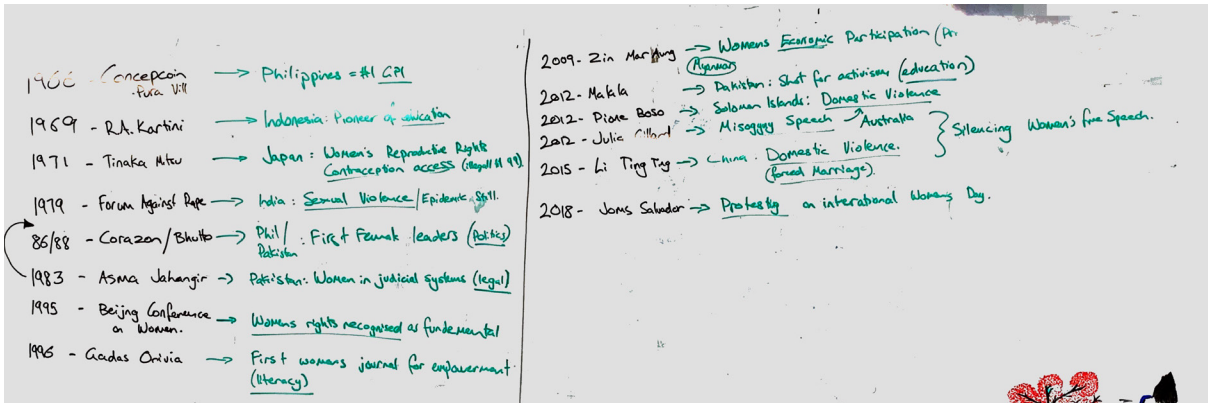
- **50**
  - Grace Lee Boggs - China
  - Doria Shafik catalyzed a women's rights movement in Egypt when in 1951 she, alongside 1,500 women, stormed parliament demanding full political rights, pay equality and reforms to personal status laws. These efforts, along with countless others to come, helped pave the way to women's right to vote in 1956.
  - Writer, feminist activist, and beauty queen Pura Villanueva Kalaw wrote and published a pamphlet in 1952 called: "How the Filipina Got the Vote," summarizing three decades of organization and legislative lobbying by women's groups, with the support – paradoxically – of men in positions of power.
- **60**
  - Until 1966, women employed in the Australian public service were faced with a choice that is difficult to comprehend today. Under the "marriage bar," they were required to give up their jobs once they married
  - The release of the oral contraceptive pill 'Anovlar' in Australia on 1 February 1961 ushered in a momentous change in women's lives.
- **70**
  - As a Japanese mountaineer, Junko Tabei was the first woman to reach the top of Mount Everest in 1975
  - Starting in late 1970, an organization called *Gurūpu tatakau onna* (Group of Fighting Women) began to work towards women's liberation throughout Japan.
  - Women's centers sprang up in metropolitan areas and by 1975, translated anthologies of US and European texts were appearing regularly in Israel.[29] Various feminist publications appeared in the mid-1970s including *Women as Human Beings* by Shulamit Aloni.
- **80**
  - Having served as the first female president of the Philippines, Corazon Aquino's leadership stemmed from opposition to then-dictator Ferdinand Marcos.
  - *Prominent human rights lawyer since the 1980s, Asma Jahangir fought tirelessly for the rights of women and against extremism, corruption and domestic violence.*

18 | 0.4055

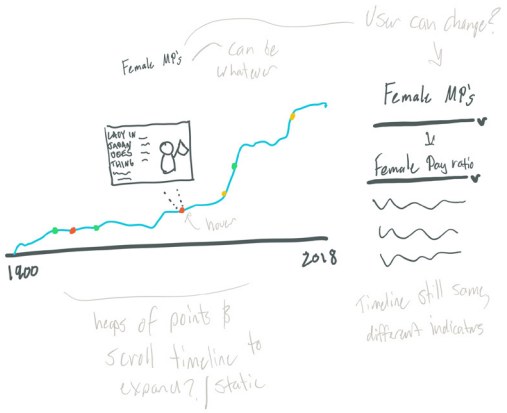
A	B	C
Country Name	Indicator	2006
Armenia	Overall Global Gender Gap Index	
Armenia	Global Gender Gap Political Empowerment subindex	
Armenia	Global Gender Gap Economic Participation and Opportunity Subindex	
Armenia	Global Gender Gap Educational Attainment Subindex	
Armenia	Global Gender Gap Health and Survival Subindex	
Australia	Overall Global Gender Gap Index	0.7163
Australia	Global Gender Gap Political Empowerment subindex	0.1634
Australia	Global Gender Gap Economic Participation and Opportunity Subindex	0.7259
Australia	Global Gender Gap Educational Attainment Subindex	1
Australia	Global Gender Gap Health and Survival Subindex	0.9761
Azerbaijan	Overall Global Gender Gap Index	
Azerbaijan	Global Gender Gap Political Empowerment subindex	
Azerbaijan	Global Gender Gap Economic Participation and Opportunity Subindex	
Azerbaijan	Global Gender Gap Educational Attainment Subindex	
Azerbaijan	Global Gender Gap Health and Survival Subindex	
Bangladesh	Overall Global Gender Gap Index	0.6269
Bangladesh	Global Gender Gap Political Empowerment subindex	0.2673
Bangladesh	Global Gender Gap Economic Participation and Opportunity Subindex	0.423
Bangladesh	Global Gender Gap Educational Attainment Subindex	0.8681
Bangladesh	Global Gender Gap Health and Survival Subindex	0.9495
Brunei Darussalam	Overall Global Gender Gap Index	
Brunei Darussalam	Global Gender Gap Political Empowerment subindex	
Brunei Darussalam	Global Gender Gap Economic Participation and Opportunity Subindex	
Brunei Darussalam	Global Gender Gap Educational Attainment Subindex	
Brunei Darussalam	Global Gender Gap Health and Survival Subindex	
Bhutan	Overall Global Gender Gap Index	
Bhutan	Global Gender Gap Political Empowerment subindex	
Bhutan	Global Gender Gap Economic Participation and Opportunity Subindex	
Bhutan	Global Gender Gap Educational Attainment Subindex	
Bhutan	Global Gender Gap Health and Survival Subindex	
China	Overall Global Gender Gap Index	0.656
China	Global Gender Gap Political Empowerment subindex	0.1107
China	Global Gender Gap Economic Participation and Opportunity Subindex	0.6206
China	Global Gender Gap Educational Attainment Subindex	0.9574
China	Global Gender Gap Health and Survival Subindex	0.9355
Fiji	Overall Global Gender Gap Index	

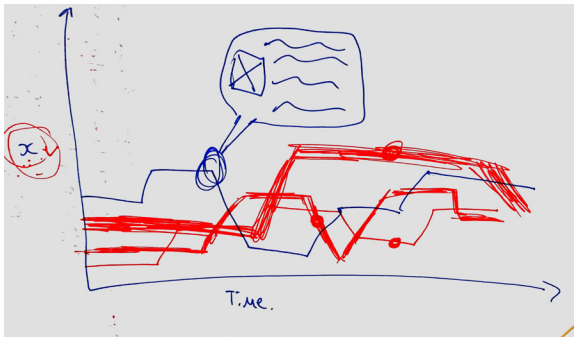
A3_data | Sheet2 | +

We then met with all the womens stories we had found and then discussed them and which correlating data points we would use - keeping the end display of the data a central part of our discussion.



Each segment of the visualisation was to focus on a different period of time with one Asian womens story and then corresponding graph - ending in a main timeline of the growth in Asia's Gender Parity Index over time.

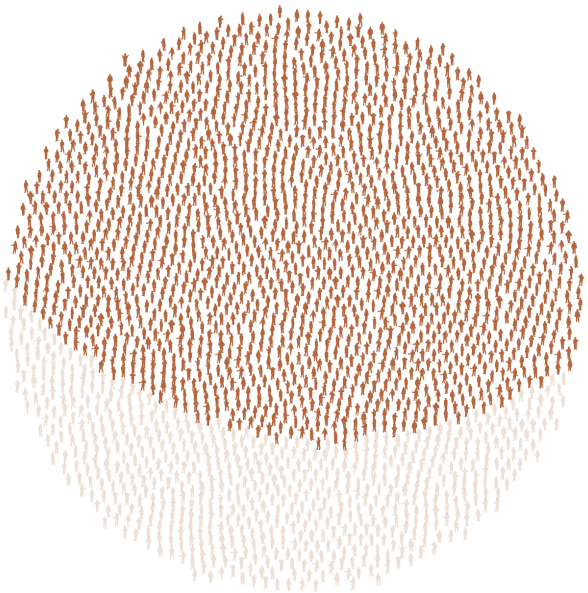




Our search for womens stories confirmed that there was a need for this type of information to be more readily accessible - it was incredibly difficult to find them and impossible to find one central resource. Information about womens liberation and on individual women is remarkably Eurocentric - as if the internet does not recall liberation occurring outside of the West.

The timeline idea was pitched to the studio tutors and they were concerned about its complexity. Conceptually it was well received but concepts didn't matter if we couldn't complete it in time. They also pointed out a problem we'd been toying with already: wether to pursue a singular graph with more mathematical complexity translated into visual appeal like below or small multiples.

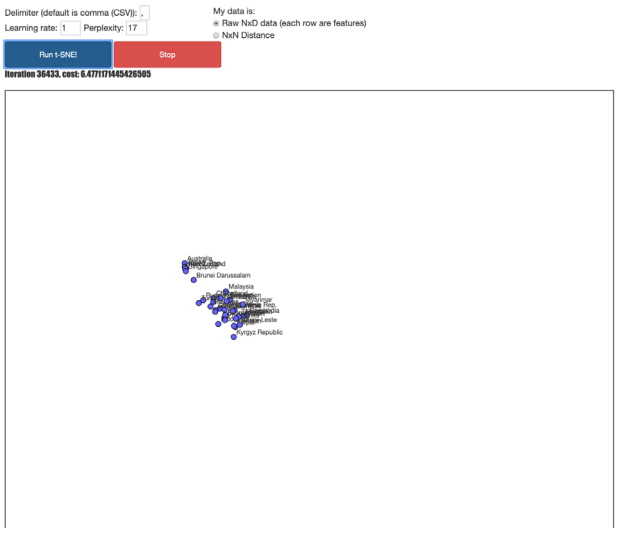
To test the more complex - we attempted to use a t-SNE algorithm to process our data and see what we could produce as a singular visualisation. The Global Gender Gap report was our basis for this as it had been integral in our prior visualisations as the richest source of data crossing multiple gender factors that had been normalised by their grading rules into same range of scores for each country.



(Each 🧍 represents about 4,000 jobs)

Take Trump's claim in February that his daughter Ivanka created "millions of jobs" through the Pledge to America's Workers, a White House initiative to encourage professional development for workers across different industries. Trump later provided a more specific number: "Think of it: 6.5 million. And these are jobs that, for the most part, would not have happened."

What happened to all the jobs Trump promised? from ProPublica



Repeatedly running the data through the t-SNE software was necessary not only to see the variations between alternate settings, but also to increase the chances of find correlations as t-SNE has no method of consistently finding the global minima, meaning each run time could produce a different result. Unfortunately we were unable to find any major correlations within our data as we believe the sample size of 34 countries that we had data from the Asia Pacific region was not diverse enough.

This caused us to continue the small multiples approach - but we ran into a massive problem. The Gender Gap Reports index which we'd been planning to utilise as our timeline only began in 2010 - four decades after where our narrative data began. We were faced with either starting the timeline from 2010 or pivoting to a new idea. Judging from how difficult it was to get narratives about Asian women - we needed to pivot ASAP.

0.731 / 35

AUS

SELECTED CONTEXTUAL DATA

Workforce Participation	female	male	value
Non-discrimination laws, hiring women			yes
Youth not in employment or education	10.3	9.4	1.09
Unemployed adults	5.8	5.7	1.02
Discouraged job seekers	54.0	43.5	1.24
Workers in informal employment	–	–	–
High-skilled share of labour force	20.1	18.0	1.12
Workers employed part-time	46.8	24.4	1.92
Contributing family workers	0.3	0.2	1.40
Own-account workers	8.1	12.8	0.64
Work, minutes per day	483.0	475.7	1.02
Proportion of unpaid work per day	64.4	36.1	1.78

Economic Leadership	female	male	value
Law mandates equal pay			yes
Advancement of women to leadership roles			[2] 0.72
Boards of publicly traded companies	23.1	76.9	0.30
Firms with female (co-)owners			–
Firms with female top managers			–
Employers	4.2	0.2	22.99

Care	female	male	value
Length of parental leave (days)			126
Length of maternity/paternity leave (days)	–	–	
Wages paid during maternity/paternity leave	–	–	
Provider of parental leave benefits			gov
Provider of maternity/paternity leave benefits	–	–	
Government supports or provides childcare			yes
Government provides child allowance			yes

Education and Skills	female	male	value
Out-of-school children	2.5	3.1	0.80
Primary education attainment, adults	100.0	100.0	1.00
Primary education attainment, 25-54	100.0	100.0	1.00
Primary education attainment, 65+	99.1	99.4	1.00
Out-of-school youth	5.3	9.0	0.59
Secondary education attainment, adults	73.3	77.8	0.94
Secondary education attainment, 25-54	99.9	99.8	1.00
Secondary education attainment, 65+	76.5	80.2	0.95
Tertiary education attainment, adults	31.8	27.7	1.15
Tertiary education attainment, age 25-54	36.2	28.7	1.26

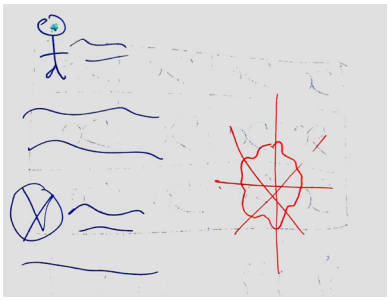
The Global Gender Gap Report 2018, World Economic Forum

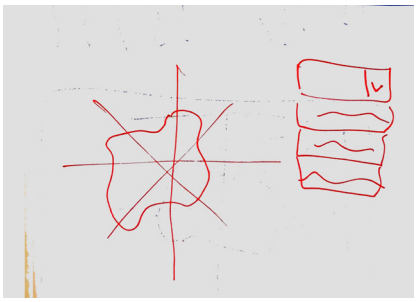
Something we'd been discussing was how the Global Gender Gap report had so much rich data but did not exist in a digital format. The data had been so integral to our understanding of gender parity throughout our project and yet only was produced in PDF - there was no way to manipulate or explore the data interactively. Seeing as the report had been so important to our work, we thought why not make the report interactive ourselves?

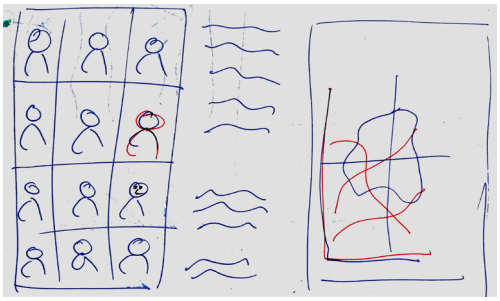
We initially began translating the first of 15 PDF's into a workable format in Excel, but this quickly proved a massive time sink - thankfully we found it in hidden on the Worldbanks TCdata360.

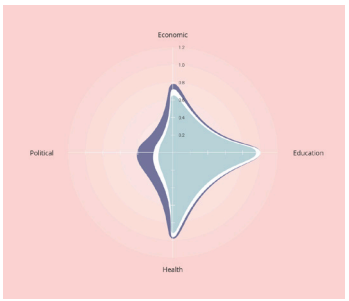
Once we had the massive CSV, we began cleaning the data. First we filtered the large global set to include only Asia and removed unneeded information (more than 9 columns per country with unused information like country codes) as the information was not necessary for our visualisation and would have made targeting the data in the code more complex. This was then made into a new sheet with just necessary information and reformatted with more semantic columns and rows for easier access.

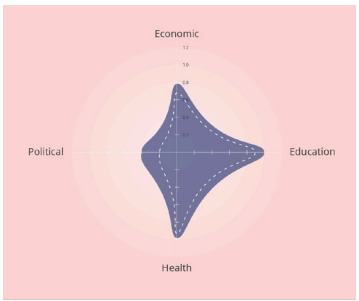
Now that we had an idea of the data we were working with, we each sketched multiple iterations of how the chart would be presented. A Radar graph was chosen as it was the best type for contrasting and comparing all of the four variables that made up a countries total score, as well as displaying the actual score on the graph. This allowed a potential user to see a countries total score and see how each factor contributed to the score in a visually weighted method.

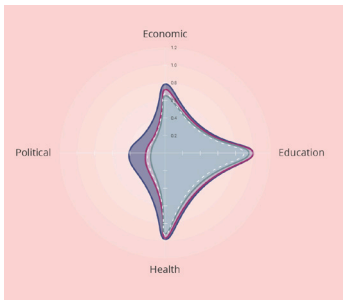


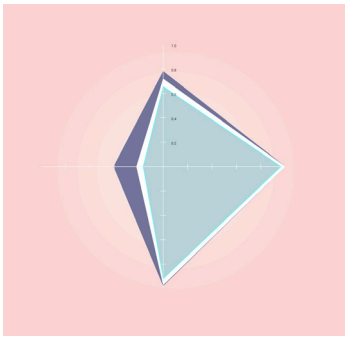


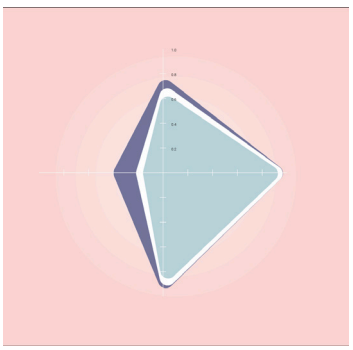


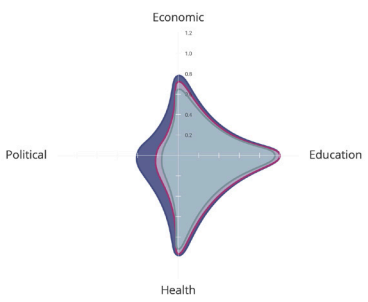




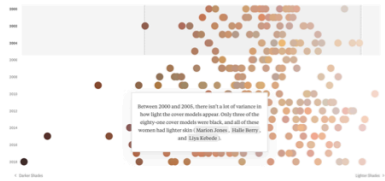




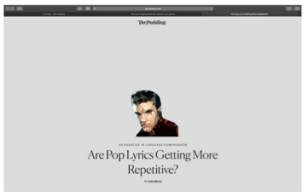




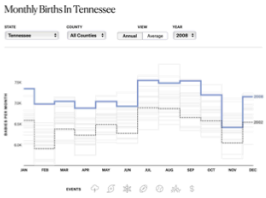
“Scrollytelling” is an online storytelling technique in which more and more content is revealed as the user scrolls down the page. We mapped out and wrote the content for a scrollytelling feature on our visualisation - we wanted to use some interesting points or contrasts between country features over time as an explainer prologue that both enticed the viewer and explained the visualisations interactions. It did not make it into our final visualisation due to time and complexity constraints, however we hope to continue our visualisation and host it post this course so that other people who hoped to interact with the Gender Gap Reports data can now do so.



https://pudding.cool/2019/04/vogue/ - This was specifically about skin color but I like the one gradiated color one variable look esp if we are changing var. Information highlight bar is cool too - can highlight whole vert/hori segment (notice left axis) and magnify specific portion of segment with opacity and dotted line. Could fill select points w image like below: ***no longer useful for new GPI graph

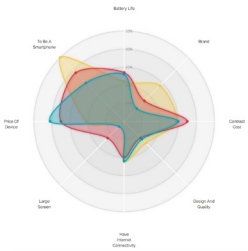


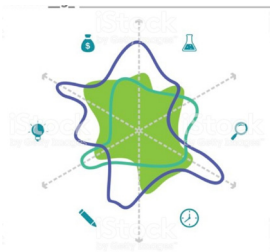
https://pudding.cool/2017/05/song-repetition/ - On open this one begins with a width/height 100% section with title and details and then you scroll onto visualisation - could save us lots of space on vis for title and other auxillary info like little about and our names etc

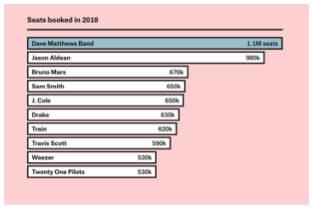


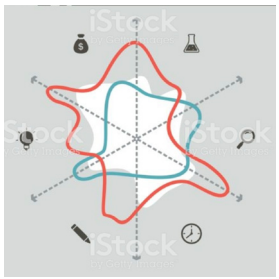
https://pudding.cool/2017/05/births/ - Lines on this graph are thin and low opacity and change to dotted line on hover and then block color when selected - interesting interactivity and allows for points to get message across (could be used in radar graph too when countries stacked)

https://pudding.cool/2019/03/pop-music/ - The pale color background and muted title text with bold accent colors for data points and then heavy bordered white bg for tooltips. This fits in with our current motif nicely even though inverted - would look cute with our fonts.



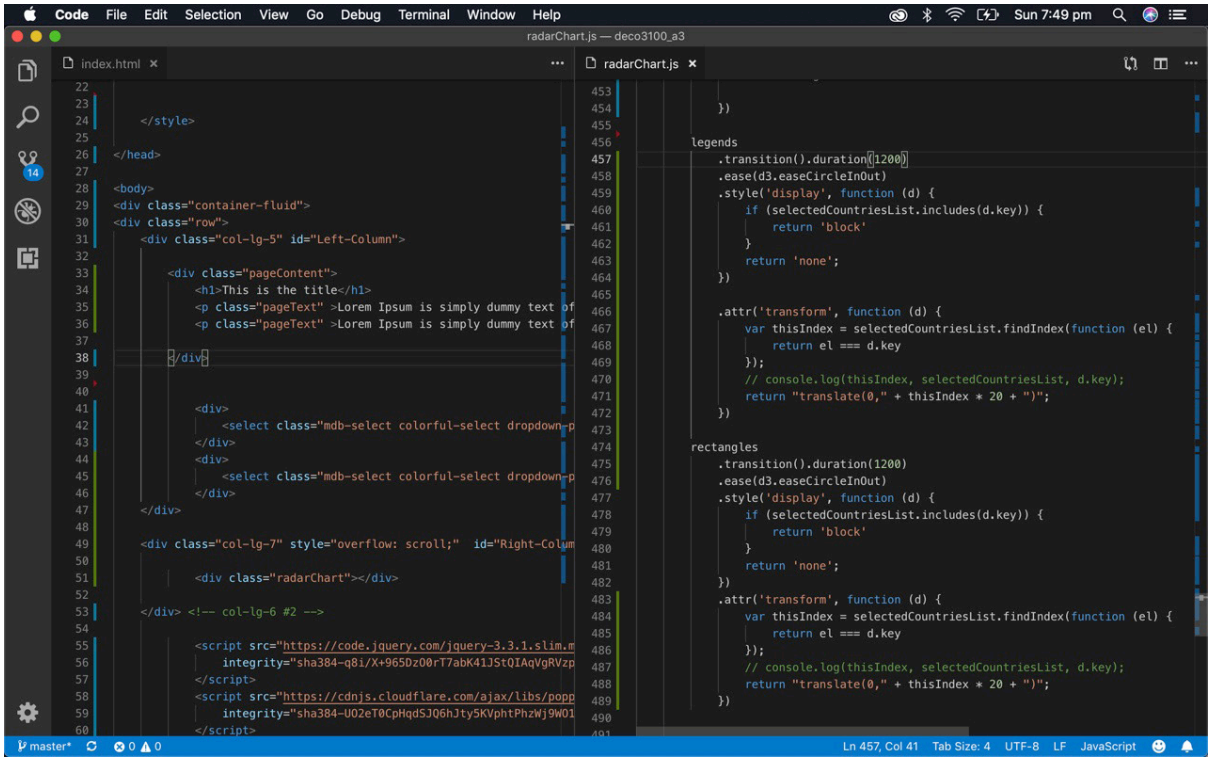


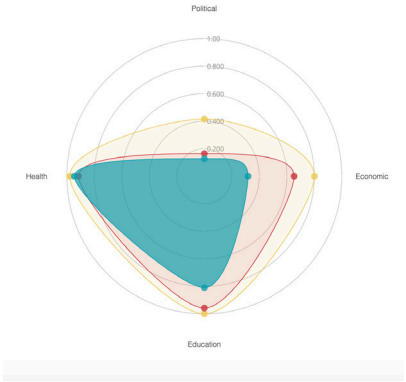


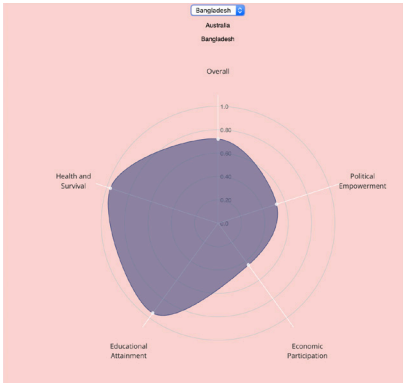


Our sketching iterations had lead us to a solid visual concept of how we’d represent the data. A moodboard was created with all the visual research we’d completed and used to create illustrator mockups. As we aimed to create a cohesive story across all of our projects, the same fonts were reused - they had a breaking newsprint vibe as a header yet were still legible at smaller font sizes. The prior visualisations had used dark backgrounds with bright highlights - we opted to invert this to a bright scheme with muted pastels as the data types - this was to allow multiple data types to be stacked with opacities more effectively as they were adding to a light background as opposed to subtracting. The pink and overall aesthetics were borrowed from current trends in highly popularised data visualisations.

To achieve a coding result that best displayed the Global Gender Reports data in an interactive fashion, we first scoped out current radar graphs online. We used this code in conjunction with the tutorial content to first import the CSV and then group and nest the data in an array. We used inbuilt d3 functions to draw a grid and then tested iterations of the radar chart using only three countries. We then built interactivity using jQuery and Bootstrap though drop down menus for country selection and hover and active states on the graph. This was programatically complex but we achieved as close to the interactions we envisaged as we could before the due date.







At the present time our visualisation is focused only on Asia and the Pacific to meet the assessment guidelines. We had a lot of richer ideas for the interactivity and narrative aspects of the visualisation yet had to opt out of these as they added complexity to our code and caused errors that made the base graphic not display correctly - especially in displaying the data as a timeseries. We finessed the base for this assignment, but are going to extend it and add our elements and expand it to the entire world dataset from the World Economic Forum and host it for others as a personal project.