DATA ANALYTICS PRESENTATION.

Project Summary

WHAT DETERMINES HOW LONG WE LIVE?

By Favour Achuba

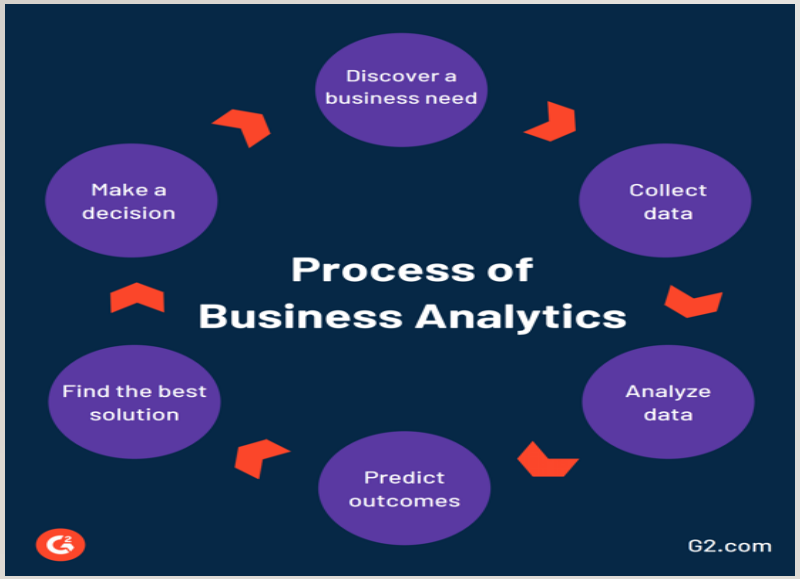
ME?

- A dedicated Professional with over three years' experience in healthcare recruitment, IT helpdesk and customer service.
- I'm passionate about analysing data, drawing insights, implementing solutions
- And lawn tennis!

WHY DATA ANALYTICS?

- As a student, there was nothing I enjoyed more than econometrics.
- As a recruiter, I was more interested in invoicing and payroll.
- I was the HR advisor obsessed with spread sheets.
- I simply enjoy the story telling process in data!

WHAT NEXT?



I have chosen to pursue a career as a business analyst because I am more intrigued as to how data analysis impacts business processes and output...

And of course great incentives!

MY PROJECT

- What determines how long we live?
- Is it us?
- The government?
- Our Environment?
- Luck?

DATA ANALYSIS - EXCEL

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	***life_expectancy***			***adult_mortality***			***infant_deaths***			***alcohol***			***percentage_expenditure***	
2														
3	Mean	69.22493169		Mean	164.7964481		Mean	30.30394826		Mean	4.602860787		Mean	738.2512955
4	Standard Error	0.176006136		Standard Error	2.296983715		Standard Error	2.175632402		Standard Error	0.077360917		Standard Error	36.67514875
5	Median	72.1		Median	144		Median	3		Median	3.755		Median	64.91290605
6	Mode	73		Mode	12		Mode	0		Mode	0.01		Mode	0
7	Standard Deviation	9.523867488		Standard Deviation	124.292079		Standard Deviation	117.9265013		Standard Deviation	4.052412659		Standard Deviation	1987.914858
8	Sample Variance	90.70405193		Sample Variance	15448.5209		Sample Variance	13906.65971		Sample Variance	16.42204836		Sample Variance	3951805.483
9	Kurtosis	-0.234477394		Kurtosis	1.748860208		Kurtosis	116.0427561		Kurtosis	-0.80290922		Kurtosis	26.57338739
10	Skewness	-0.638604736		Skewness	1.174369488		Skewness	9.78696295		Skewness	0.589562528		Skewness	4.652051348
11	Range	52.7		Range	722		Range	1800		Range	17.86		Range	19479.91161
12	Minimum	36.3		Minimum	1		Minimum	0		Minimum	0.01		Minimum	0
13	Maximum	89		Maximum	723		Maximum	1800		Maximum	17.87		Maximum	19479.91161
14	Sum	202690.6		Sum	482524		Sum	89033		Sum	12630.25		Sum	2168982.306
15	Count	2928		Count	2928		Count	2938		Count	2744		Count	2938

	P	Q	R	S	T	U	V	W	X	Y	Z
	hepatitis_B			***measles***			***BMI***			***under_five_deaths***	
	Mean	80.9404612		Mean	2419.59224		Mean	38.32124656		Mean	42.0357386
	Standard Error	0.51334627		Standard Error	211.5603305		Standard Error	0.371951928		Standard Error	2.960068602
	Median	92		Median	17		Median	43.5		Median	4
	Mode	99		Mode	0		Mode	58.5		Mode	0
	Standard Deviation	25.0700156		Standard Deviation	11467.27249		Standard Deviation	20.0440335		Standard Deviation	160.4455484
	Sample Variance	628.505682		Sample Variance	131498338.3		Sample Variance	401.7632791		Sample Variance	25742.774
	Kurtosis	2.7702594		Kurtosis	114.8599032		Kurtosis	-1.291095468		Kurtosis	109.7527951
	Skewness	-1.9308451		Skewness	9.441331947		Skewness	-0.219311603		Skewness	9.495064657
	Range	98		Range	212183		Range	86.3		Range	2500
	Minimum	1		Minimum	0		Minimum	1		Minimum	0
	Maximum	99		Maximum	212183		Maximum	87.3		Maximum	2500
	Sum	193043		Sum	7108762		Sum	111284.9		Sum	123501
	Count	2385		Count	2938		Count	2904		Count	2938

EXCEL CONT'D

Development status	Average of life_expectancy	Max. of adult_mortality	Min. of total_expenditure	Sum of under_five_deaths	Count of measles
Developed	79.19785156	229	1.1	927	512
Developing	67.11146523	723	0.37	122574	2426
Grand Total	**69.22493169**	**723**	**0.37**	**123501**	**2938**

The table of descriptive statistics contains a lot of details and is generated for each variable which may be cumbersome and tiring to read. A pivot table helps compress that information and draw patterns which we wolud like to see in our data.
For example, the above table shows avg life expectacy, count of measles etc beased on the status of each country. So we have an idea of what each variable is like in each country.
Here we can immediately see that developed countries have a higher average life expectancy, lower adult and child mortality rates and tend to spend a higher percentage of their GDP on health.

We can also use formulars to produce descriptive statistics (min,max, count etc.) and draw existing patterns in our data as demostrated in the table below

Max Life expectancy amongst developing countries (Max function)	Contries below the devloping contries LE Avg (Countifs)	Vlookup for adult_mortality in Nigeria
89	66.8	344
	<67	Nigeria

Column one: shows the maximum life expectancy value amongst all developing countries in the sample using the maxif funtion. According to the data, a person from a developing country is expected to live till 89 at most.
Column two: containsthe number of countries that have a life expectency lower than the sample average for developing countries, table 2 vshows this to be 67.1 years of age. countif function is utilised to yield the result.
Column three: here we were interested in seeing what the adult mortality rate is for nigerians without having to scroll through this large data set. The vlookup function is adept at fetching this information.
As seen in the data-set, there are 15 entries for adult mortality in nigeria representing each year from 2000-2015, the vlookup funtion automatically picks the first one.

EXCEL – CORRELATION RESULTS

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
41	We have now had an overview of the data and spotted sone interesting patterns in the data but we do not have a firm understanding of how variables in this dataset affect each other or more importantly how they impact life expectancy .														
42	Because we are focused on how the other variables correlate with lifee expectancy, we will focus on the first column only.														
43		*life_expectancy*	*adult_mortality*	*infant_deaths*	*alcohol*	*centage_expendit*	*hepatitis_B*	*measles*	*BMI*	*under_five_deaths*	*polio*	*tal_expenditu*	*diphtheria*	*HIV_AIDS*	*GDP*
44	life_expectancy	1													
45	adult_mortality	-0.696359314	1												
46	infant_deaths	-0.196557177	0.078756012	1											
47	alcohol	0.404876761	-0.195848196	-0.115637677	1										
48	percentage_expenditure	0.381863503	-0.242859528	-0.085612222	0.341285313	1									
49	hepatitis_B	0.256761948	-0.162476325	-0.223566281	0.087548711	0.016273693	1								
50	measles	-0.157585804	0.031176412	0.501128342	-0.051826674	-0.056595677	-0.120529372	1							
51	BMI	0.567693548	-0.387016784	-0.227278888	0.33040846	0.228699753	0.150379532	-0.17597706	1						
52	under_five_deaths	-0.222529116	0.094146127	0.996628882	-0.112370397	-0.087852306	-0.233126251	0.507808707	-0.23766852	1					
53	polio	0.465555806	-0.274822815	-0.170688559	0.221733797	0.147259463	0.486170773	-0.13616601	0.284568764	-0.188720213	1				
54	total_expenditure	0.218086374	-0.115280689	-0.128616342	0.29694156	0.174419689	0.058280304	-0.10624059	0.242502604	-0.130148312	0.137330249	1			
55	diphtheria	0.479494864	-0.275131358	-0.175171496	0.222020171	0.143624426	0.611494949	-0.14188194	0.283147336	-0.195668288	0.673553321	0.152753524	1		
56	HIV_AIDS	-0.556556253	0.523820508	0.025231318	-0.048844563	-0.097856819	-0.112675448	0.030898718	-0.24371653	0.038061512	-0.15955954	-0.00138884	-0.164860095	1	
57	GDP	0.461455193	-0.296049318	-0.108427363	0.354712086	0.899372641	0.083903212	-0.07646605	0.301557394	-0.112081253	0.211975566	0.138364222	0.200665557	-0.13649082	1
58	population	-0.021538108	-0.013646972	0.556801332	-0.035252342	-0.025661888	-0.123320952	0.265966087	-0.07230102	0.544422649	-0.03854025	-0.07966184	-0.028443781	-0.02785429	-0.02826967
59	The results indicate the following:														
60	adult_mortality mortality has a strong negative correlation with life expectancy. This means if adult mortality increases, life expectancy is expected to fall.														
61	Infant mortality,measles, Aids and population also have a negative correlation with life expectancy. A rise in any of the afore mentioned is expected to affect life expectancy negatively.														
62	percentage_expenditure on health, polio immunization, diphtheria immunization coverage and gdp per capita all have a psitive correlation with life expectancy indicating that as these variables increase, life expectancy should increase as well.														

DATA ANALYSIS - SQL

Query 1 | Data-bootcamp-project-3

Limit to 1000 rows

```
38
39  Select Avg(life_expectancy) as "Avg_LE",  Avg(total_expenditure) as "Avg_tot_exp", Avg(income_composition_of_resources) as "Avg_inc_comp",
40  Avg(alcohol) as "Avg_alcohol", aVG(Schooling) as "avg_sch", Avg(BMI) as "Avg_BMI"
41  from project.data
42  where year BETWEEN 2000 AND 2007
43  AND status = "developing";
44
45  Select Avg(life_expectancy) as "Avg_LE",  Avg(total_expenditure) as "Avg_tot_exp", Avg(income_composition_of_resources) as "Avg_inc_comp",
46  Avg(alcohol) as "Avg_alcohol", aVG(Schooling) as "avg_sch", Avg(BMI) as "Avg_BMI"
47  from project.data
48  where year BETWEEN 2008 AND 2015
49  AND status = "developing";
50
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Avg_LE	Avg_tot_exp	Avg_inc_comp	Avg_alcohol	avg_sch	Avg_BMI
65.58981788079468	5.279594370860922	0.5081382450331132	3.5829470198675586	10.076655629139076	32.96307947019871

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Avg_LE	Avg_tot_exp	Avg_inc_comp	Avg_alcohol	avg_sch	Avg_BMI
68.06962233169128	5.008768472906394	0.5989802955665029	2.911256157635484	11.293185550082091	36.89811165845651

TREND ANALYSIS – SQL (DEVELOPED)

Query 1 | Data-bootcamp-project-3

Limit to 1000 rows

```
56  Select Avg(life_expectancy) as "Avg_LE",  Avg(total_expenditure) as "Avg_tot_exp", Avg(income_composition_of_resources) as "Avg_inc_comp",
57  Avg(alcohol) as "Avg_alcohol", aVG(Schooling) as "avg_sch", Avg(BMI) as "Avg_BMI"
58  from project.data
59  where year BETWEEN 2000 AND 2007
60  AND status = "developed";
61
62  Select Avg(life_expectancy) as "Avg_LE",  Avg(total_expenditure) as "Avg_tot_exp", Avg(income_composition_of_resources) as "Avg_inc_comp",
63  Avg(alcohol) as "Avg_alcohol", aVG(Schooling) as "avg_sch", Avg(BMI) as "Avg_BMI"
64  from project.data
65  where year BETWEEN 2008 AND 2015
66  AND status = "developed";
67
68  -- Just as we see in the case of developing nations, we can see an increase in average life expectancy in more recent years in developed counterparts
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Avg_LE	Avg_tot_exp	Avg_inc_comp	Avg_alcohol	avg_sch	Avg_BMI
78.10312499999999	7.231445312500001	0.7564687499999997	10.096523437500005	14.008203124999994	50.062890624999994

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Avg_LE	Avg_tot_exp	Avg_inc_comp	Avg_alcohol	avg_sch	Avg_BMI
80.29257812499999	6.932382812500003	0.7886679687500002	8.482148437500003	14.711718750000006	53.544921874999986

PREVALENCE OF LIFE THREATENING DISEASE

Query 1 | Data-bootcamp-project-3

Limit to 1000 rows

```
74  -- 2. What is the prevelance of factors and life threatning disease that theoriticaly tend to impact Life expectacy negatively.
75  -- what is the prevelance in both developed and developing groups?
76
77  Select Sum(adult_mortality) as "sum_adul_mort", sum(infant_deaths) as "sum_infant_mort", Sum(measles) as "sum_measles",
78  sum(hiv_aids) as "sum_aids", Sum(thinness_1_to_19_years) as "sum_adol_thinness"
79  from project.data
80   where status = "developing";
81
82  Select Sum(adult_mortality) as "sum_adul_mort", sum(infant_deaths) as "sum_infant_mort", Sum(measles) as "sum_measles",
83  sum(hiv_aids) as "sum_aids", Sum(thinness_1_to_19_years) as "sum_adol_thinness"
84  from project.data
85   where status = "developed";
86
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

sum_adul_mort	sum_infant_mort	sum_measles	sum_aids	sum_adol_thinness
441725	88268	6853271	5067.100000000017	13378.300000000003

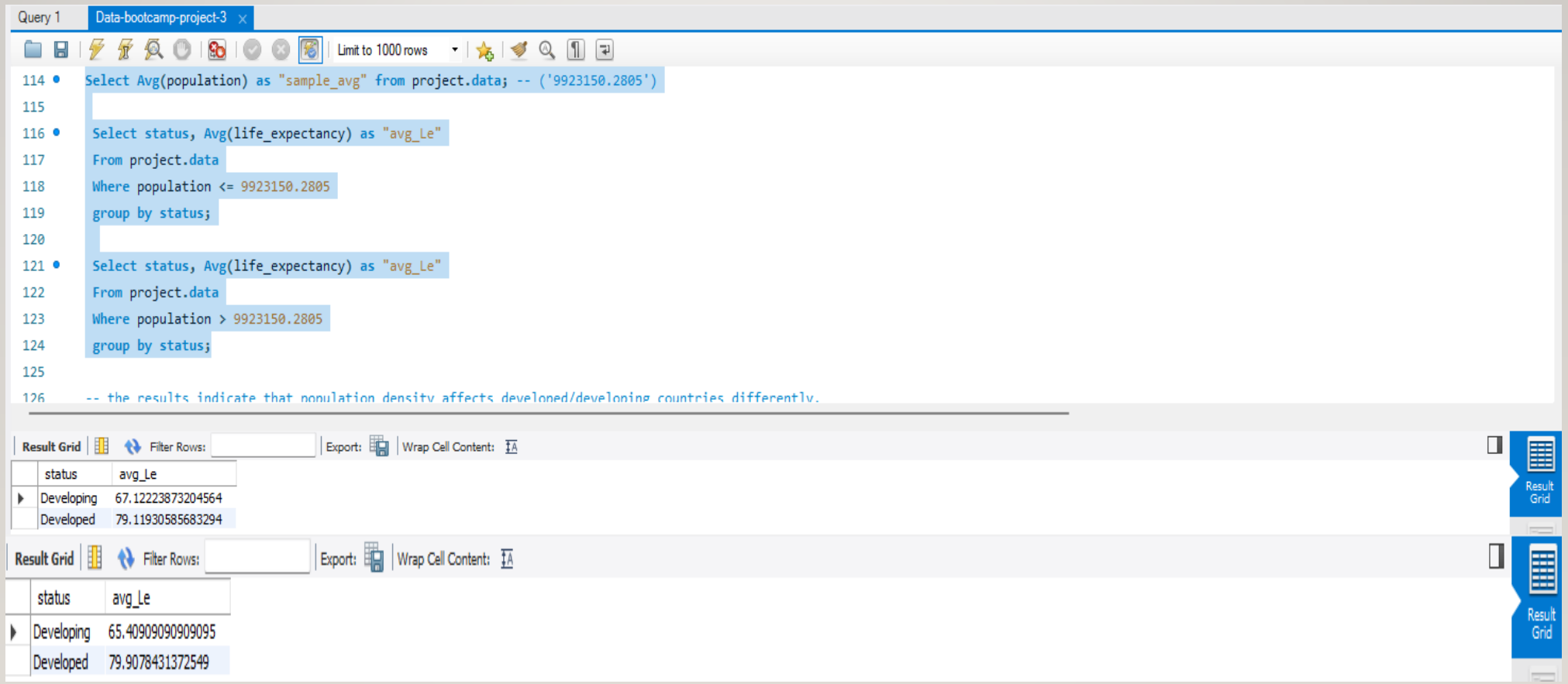
Result Grid | Filter Rows: | Export: | Wrap Cell Content:

sum_adul_mort	sum_infant_mort	sum_measles	sum_aids	sum_adol_thinness
40799	765	255491	51.20000000000046	676.2000000000006

Result Grid

Result Grid

POPULATION AND LE



GDP PER CAPITA AND LE

```
135
136 •  Select status, Avg(life_expectancy),
137    Case When GDP <= 1025 Then "low_income"
138    When GDP between 1026 and 12475 Then "Middle_income"
139    When GDP >=12476 Then "High_income"
140    ELSE "Unknown"
141    End as "Gdp_cat"
142    From project.data
143    Group by status, gdp_cat
144    Order by 1;
145
146    -- based on the results, it is clear that both in developed and developing worlds, countries with a high GDP per capita have a higher life expectancy
147    -- whereas, countries with low income per capita have a lower average life expectancy compared to middle and high per capita counterparts.
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

status	Avg(life_expectancy)	Gdp_cat
Developed	80.40042735042735	High_income
Developed	77.58947368421053	low_income
Developed	78.49508196721311	Middle_income
Developing	76.64853801169592	High_income
Developing	63.38770491803278	low_income
Developing	70.06363636363635	Middle_income

EXPENDITURE ON HEALTH AND GDP

```
150    -- recommenations from various studies advice that expenditure on health should be at least 6- 7% of GDP
151
152    Select status, Avg(life_expectancy),
153    Case When total_expenditure < 6.0 Then "below standard"
154    when  total_expenditure between 6.0 and 7.0 Then "acceptable standard"
155    when total_expenditure  > 7.0 Then "above standard"
156    Else "Unknown2"
157    End as health_exp_cat
158    From project.data
159    Group by status, health_exp_cat
160    Order by 1
161
162    -- the results for developing nations indicate that average life expectancy is higher when percetage expenditure on health is 6% and above ( accceptable and above standard)
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

status	Avg(life_expectancy)	health_exp_cat
Developed	79.84056603773584	above standard
Developed	75.05223880597015	acceptable standard
Developed	79.77559055118111	below standard
Developing	68.65506072874494	above standard
Developing	66.64639769452442	acceptable standard
Developing	66.3087697160883	below standard

BMI AND LE

```
167    -- ranknig is done based on CDC categorisation.
168
169    Select status, avg(life_expectancy),
170    Case When BMI < 18.5 Then "underweight"
171    When BMI between 18.5 and 24.9 Then 'Healthy'
172    When BMI between 25 and 29.9 Then "Overweight"
173    WHEN BMI >=30.0 Then "Obese"
174    ELSE 'UNKNOWN'
175    END AS 'BMI_CAT'
176    From project.data
177    Group by BMI_CAT, status
178    Order by 1;
179     -- in developed countries, people with a BMI classed as healthy have a higher average life expectancy and obese people tend to have the lowest life expectancy.
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

status	avg(life_expectancy)	BMI_CAT
Developed	79.05249999999998	Obese
Developed	79.42352941176469	underweight
Developed	81.62857142857142	Overweight
Developed	81.82857142857142	Healthy
Developing	60.06422018348621	Healthy
Developing	61.708411214953216	underweight
Developing	71.64899068322987	Obese
Developing	62.71952662721892	Overweight

Life Expectancy Trends and Triggers

Life expectancy and schooling Trend

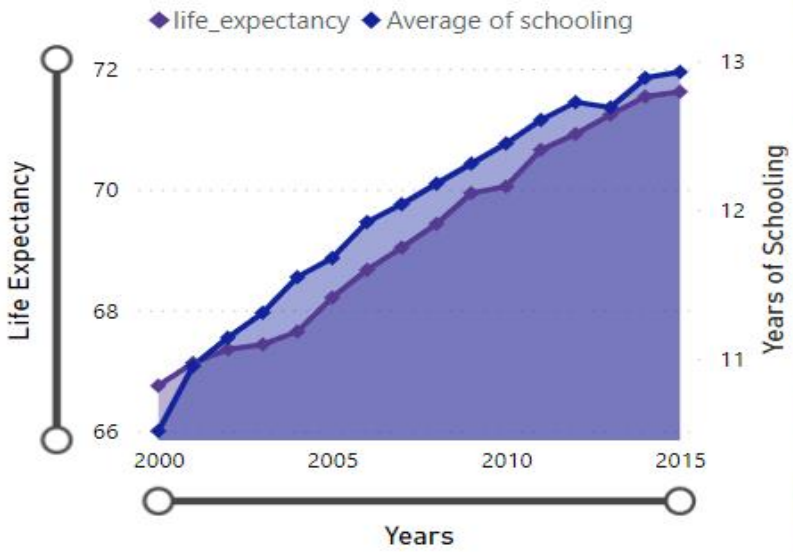
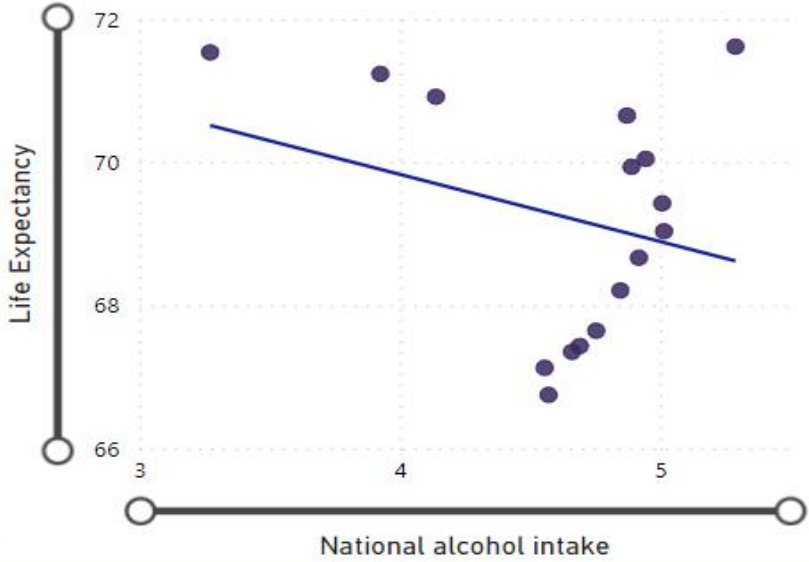


Figure 1 is a line graph showing the trend of life expectancy and years of schooling from 2000-2015. This shows that both life expectancy **(7.29% increase) and schooling (22.97% increase) follow an upward trend as the years progress.**

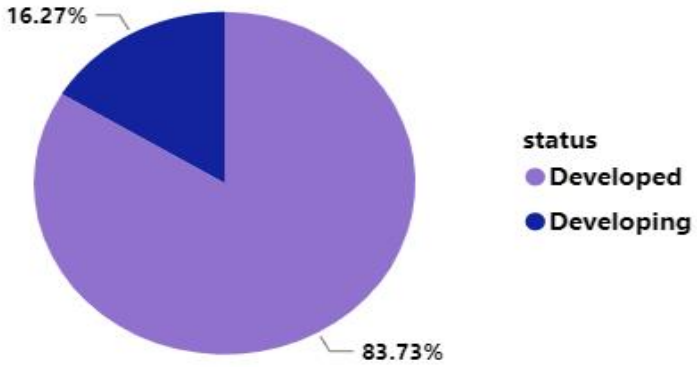
Figure 2 is a scatterplot showing the relationship between life expectancy and alcohol intake. The result **indicates a negative relationships exist**. Such that if there is an increase in alcohol intake, a fall in life expectancy is expected.
Figure 3 shows the share of GDP by status. here we find the developed nations **account for 83.73% of the total share of GDP** in the sample.
Figure 4 is an area map showing concentration of measles and aid. results shows a high prevalence in Africa, with Swaziland accounting for **10.30% of Aids** in the region.

Figure 5 is a key influence visual between life expectancy and population. this indicates that when population is less than 62181 million, **life expectancy increases by 3.36 years.** All the results discussed support our findings from SQL analysis.

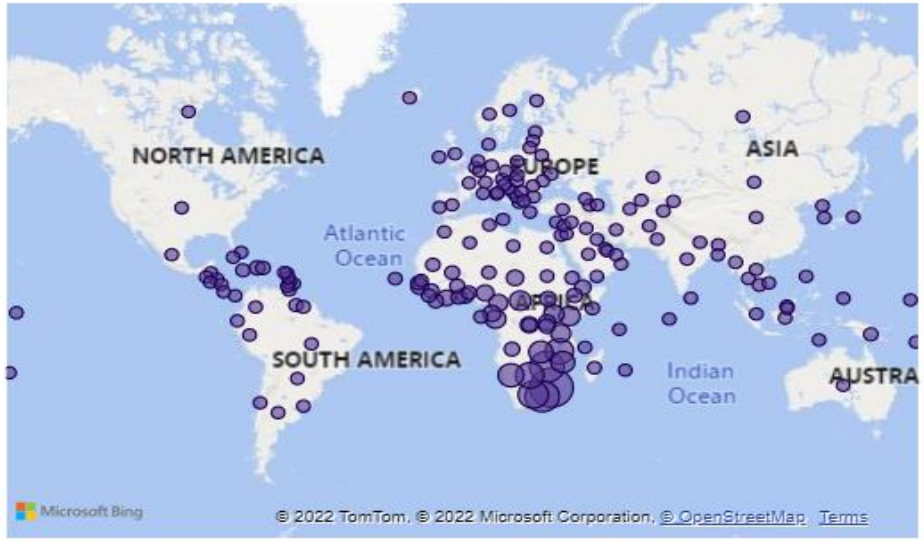
Life Expectancy VS Alcohol



Share of GDP per Capita by status



Prevalence of Measles and Aids



LE and population

Key influencers

What influences life_expectancy to: Increase ?

When... ....the average of life_expectancy increases by

population is 62181 or less → 3.36

- The trend of life expectancy, schooling, income composition, BMI has increased overtime, while alcohol intake has fallen in both groups.
- Increase in population affects life expectancy negatively in developing countries and has a positive correlation in developed countries.
- Higher GDP per capita correlates with a higher life expectancy in both groups.
- Expenditure on heath that is deemed above or at required standard correlates with a higher average life expectancy in developing countries. But in developed nations, avg LE only improves when expenditure on health is above 7% of GDP

SO WHAT DETERMINES HOW LONG WE LIVE?

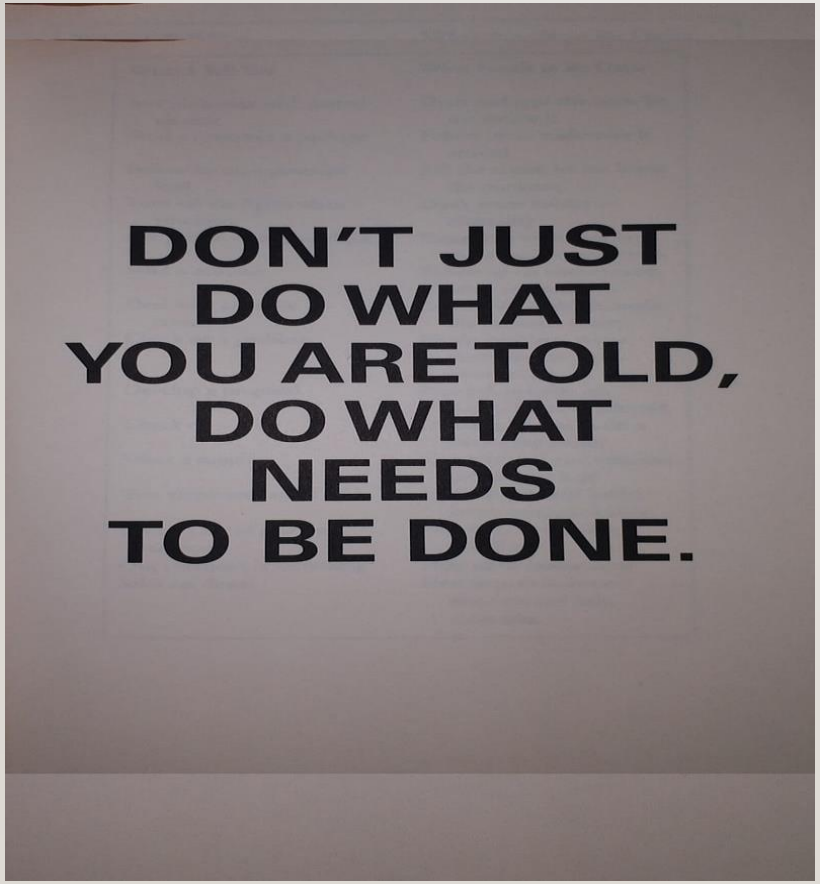
- For developed Countries, its' you!
- A healthy BMI index correlates with the highest average life expectancy (81.8 years)
- This is the highest across all variables analysed for developed countries.
- For Developing nations, its' the government!
- Developing countries with a high income capita have the highest average LE amongst the sample (76.6 years).

TAKE AWAY EDUCATIONALLY

PERSONALLY?


Independent Learning
Curious
Self Motivation
Risk Taker
Initiative
Resilient
Time Management
Reflective
Persistence
Critical thinker

CAREER WISE


DON'T JUST
DO WHAT
YOU ARE TOLD,
DO WHAT
NEEDS
TO BE DONE.


Face your problems head-on.
Do what you have to do to
take care of it. Develop a
good work ethic.
George Chuvalo
PeoplesQuotes.com


THANK YOU