Retail Sector Forecast

Data ANALYSIS and VISUALIZATION

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Github Link of the project:

https://github.com/Abhijeet-Tiwarii/Projects-Data-Analysis-and-Visualization.git

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Objective:

To analyze and visualize open data from the Australia retail chain operating in "Clothing Retailing" industry and forecast the opportunity in expansion of this industry.

Hypothetical scenario:

To date the company has only being running operation in New South Wales. However, the Board of Directors in considering an expansion into one of the following three states;

- Queensland
- Vitoria
- Western Australia

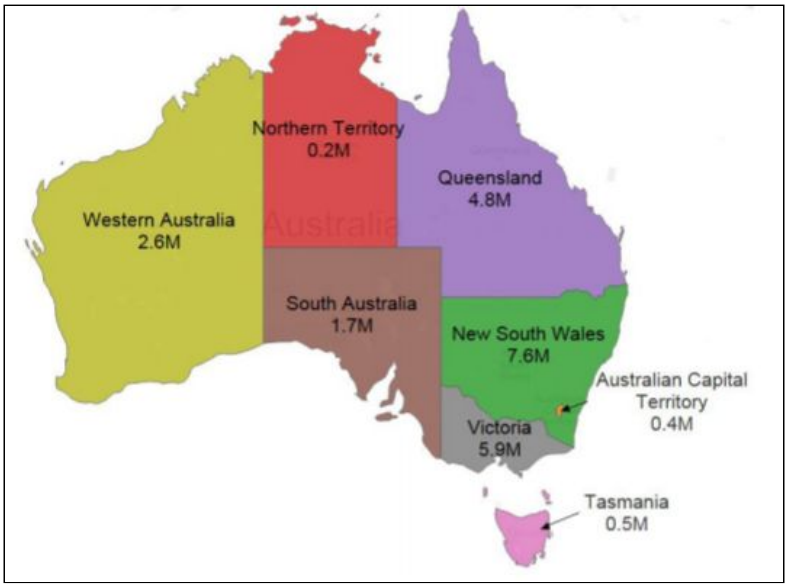


Image: Map of Australia with population

Task:

I have been asked to assess the business environment for the industry in question in each of these states and present my findings to the Board of Directors in person.

About Data:

These are following two data sets involved in this analysis:

1. Competitive research
   This file contains turnover generated by the competitors of our company in different states. It has been researched by our company's business intelligence executives. This is in the form of csv files and it would be helpful in analysing business environment.

	A	B	C	D	E
1	Company	QLD	WA	VIC	NSW
2	Competitor 1	4.57%	4.18%	7.90%	8.54%
3	Competitor 2	2.60%	1.88%	8.99%	9.23%
4	Competitor 3	2.26%	7.48%	6.71%	7.84%
5	Competitor 4	6.47%	6.70%	7.94%	9.89%
6	Competitor 5	6.82%	1.17%	8.54%	5.67%
7	Competitor 6	4.68%	6.44%	6.52%	3.03%
8	Competitor 7	7.43%	3.52%	7.12%	8.47%
9	Competitor 8	4.49%	2.42%	7.79%	9.40%
10	Competitor 9	5.72%	6.39%	8.99%	8.67%
11	Competitor 10	5.64%	7.79%	7.57%	8.50%
12	Competitor 11	6.27%	5.94%	9.21%	6.40%
13	Competitor 12	4.88%	9.07%	7.10%	8.80%
14	Competitor 13	5.15%	2.44%	9.05%	5.76%
15	Competitor 14	8.52%	2.42%	9.50%	11.49%
16	Competitor 15	11.96%	6.17%	4.54%	10.49%
17	Competitor 16	5.26%	0.29%	7.60%	6.02%

Image:Competitive research.csv

2. Turnover state by industry

   This data set has a information of various industries turnover which they had been generated over months starting from 1982 to 2015.

	A	B	C	D	E
1		Turnover ; New South Wales ; Supermarket and grocery stores ;	Turnover ; New South Wales ; Liquor retailing ;	Turnover ; New South Wales ; Other specialised food retailing ;	Turnover ; New South Wales ; Food retailing ;
2	Apr-1982	303.1	41.7	63.9	408.7
3	May-1982	297.8	43.1	64.0	404.9
4	Jun-1982	298.0	40.3	62.7	401.0
5	Jul-1982	307.9	40.9	65.6	414.4
6	Aug-1982	299.2	42.1	62.6	403.8
7	Sep-1982	305.4	42.0	64.4	411.8
8	Oct-1982	318.0	46.1	66.0	430.1
9	Nov-1982	334.4	46.5	65.3	446.2
10	Dec-1982	389.6	53.8	77.9	521.3
11	Jan-1983	311.4	43.8	65.1	420.3

Image: Retail-turnover-states-by-industry

3. Australia demographic statistics

   This data set has the population information of the states in Australia. It is recorded quarterly basis in a year.

	A	B	C	D	E
1		Estimated Resident Population ; Male ; New South Wales ;	Estimated Resident Population ; Male ; Victoria ;	Estimated Resident Population ; Male ; Queensland ;	Estimated Resident Population ; Male ; South Australia ;
2	Jun-1981	2608351	1958717	1178447	653940
3	Sep-1981	2616060	1964139	1189946	655136
4	Dec-1981	2624579	1969349	1200504	657014
5	Mar-1982	2634534	1975617	1210128	658840
6	Jun-1982	2643527	1981619	1219369	660066
7	Sep-1982	2649615	1986589	1228791	661669
8	Dec-1982	2655478	1991532	1235548	663641
9	Mar-1983	2663858	1997990	1242336	666073
10	Jun-1983	2668049	2003140	1248666	667942
11	Sep-1983	2673036	2007981	1254248	669852
12	Dec-1983	2678250	2012443	1259140	671738
13	Mar-1984	2685607	2018217	1264361	673493
14	Jun-1984	2692083	2023349	1269559	675233
15	Sep-1984	2699019	2028241	1275622	676630
16	Dec-1984	2706580	2033611	1281035	677950
17	Mar-1985	2716617	2039883	1287316	679761
18	Jun-1985	2723253	2045027	1293238	681229

Image: Australian-Demographic-Statistics

Data Reparation:

1. Competitive research.csv

   This file has States in column which makes it good for human to understand but it is not fit for Tableau to understand so that it should require some

   preparation. The preparation includes pivoting the Turnover of states, to make it a single column for further analysis as shown below.

Abc P11-Competitor-Res... Company	Abc Pivot States	# Pivot Net profit margin
Competitor 1	NSW	0.085400
Competitor 2	NSW	0.092300
Competitor 3	NSW	0.078400
Competitor 4	NSW	0.098900
Competitor 5	NSW	0.056700
Competitor 6	NSW	0.030300
Competitor 7	NSW	0.084700
Competitor 8	NSW	0.094000
Competitor 9	NSW	0.086700
Competitor 10	NSW	0.085000
Competitor 11	NSW	0.064000

2. Retail-turnover-states-by-industry.xls

   Again, this data set requires pivoting of columns to rows to make a single column for just industries and the corresponding turnover. Then, splitting so that it would be easier to

separate the name of industry from other unnecessary text as shown below,

Data1 Date	Calculation State	Calculation Industry	Pivot Turnover M$
01-Feb-00	Australian Capital Territory	Clothing retailing	7.100
01-Mar-00	Australian Capital Territory	Clothing retailing	8.500
01-Apr-00	Australian Capital Territory	Clothing retailing	9.800
01-May-00	Australian Capital Territory	Clothing retailing	10.000
01-Jun-00	Australian Capital Territory	Clothing retailing	10.800
01-Jul-00	Australian Capital Territory	Clothing retailing	8.300
01-Aug-00	Australian Capital Territory	Clothing retailing	7.200
01-Sep-00	Australian Capital Territory	Clothing retailing	8.700

Image: pivoted and splitted Retail-turnover-states-by-industry.xls

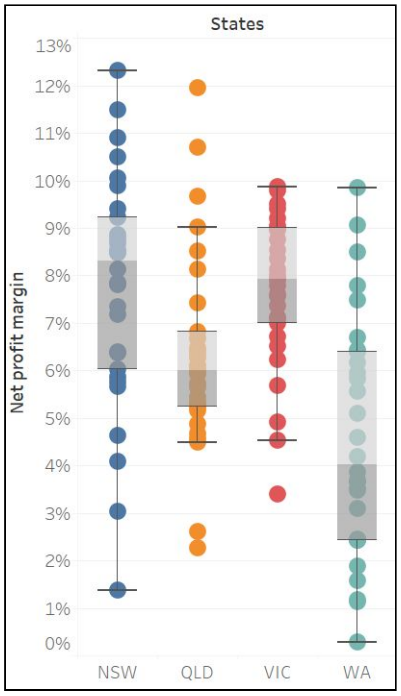
3. Australian-Demographic-Statistics.xls

   This dataset is similar to Retail-turnover-states-by-industry.xls so it will be prepared and cleaned like that, image shown below is the prepard dataset.

Data1 F1	Calculation Gender	Calculation State	Pivot Population
01-Mar-82	Persons	Australia	15,121,698
01-Mar-83	Persons	Australia	15,346,242
01-Mar-84	Persons	Australia	15,531,541
01-Mar-85	Persons	Australia	15,736,665
01-Mar-86	Persons	Australia	15,961,498
01-Mar-87	Persons	Australia	16,204,041
01-Mar-88	Persons	Australia	16,471,767
01-Mar-89	Persons	Australia	16,764,042

Results:

First of all, by using box plot we are assessing the business environment in all the states. We have our Competitive research.csv file which would help in this process. Following are the findings from the box plot,



NSW (New South Wales): The number of outliers are more but the median is of 8% which is good enough. Due to more variance, it is quite uncertain for a new company to fall in box.

QLD(Queensland): The median is low which says the companies are not performing well overall in this state. Variance is low means chances of new company fall in the box.

VIC(Victoria): Althrought, the median is just 8% but the variance is low, contrary to NSW which makes it a good state for. This makes it more certain for a new upcoming company to fall in this box.

WA(Western Australia): The median is low as 4% as well as variance is high means, uncertainty for the upcoming company.

Second, I have Retail-turnover-states-by-industry.xls file to analyse about turnovers of industries in states. I have narrowed down my search to only Clothing industry image below. I have applied trendline to see their growth.

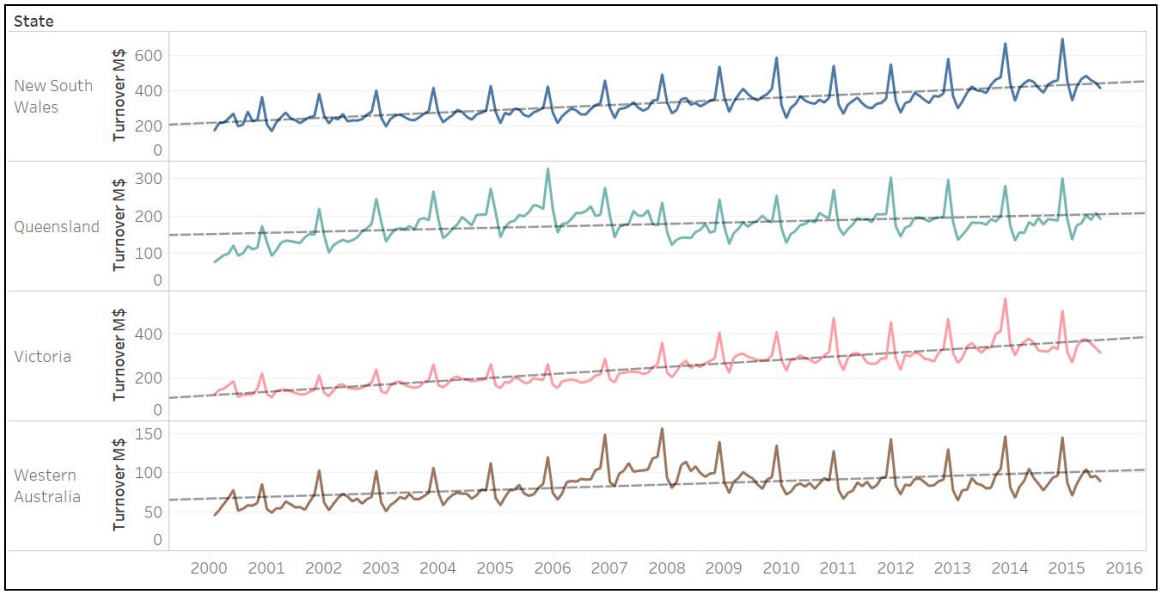


Image: Clothing industry turnover

By seeing above image we can conclude that industry in NSW and VIC is growing fast as compared to other two. But, this is not a normalised analysis because they are having different population. To normalise it we need to see per capita consumption change in these states. In order to see this change we have another dataset which is Australian-Demographic-Statistics.xls.

Per capita sales = Turnover/Population

Below image shows is the graph of per capita sales

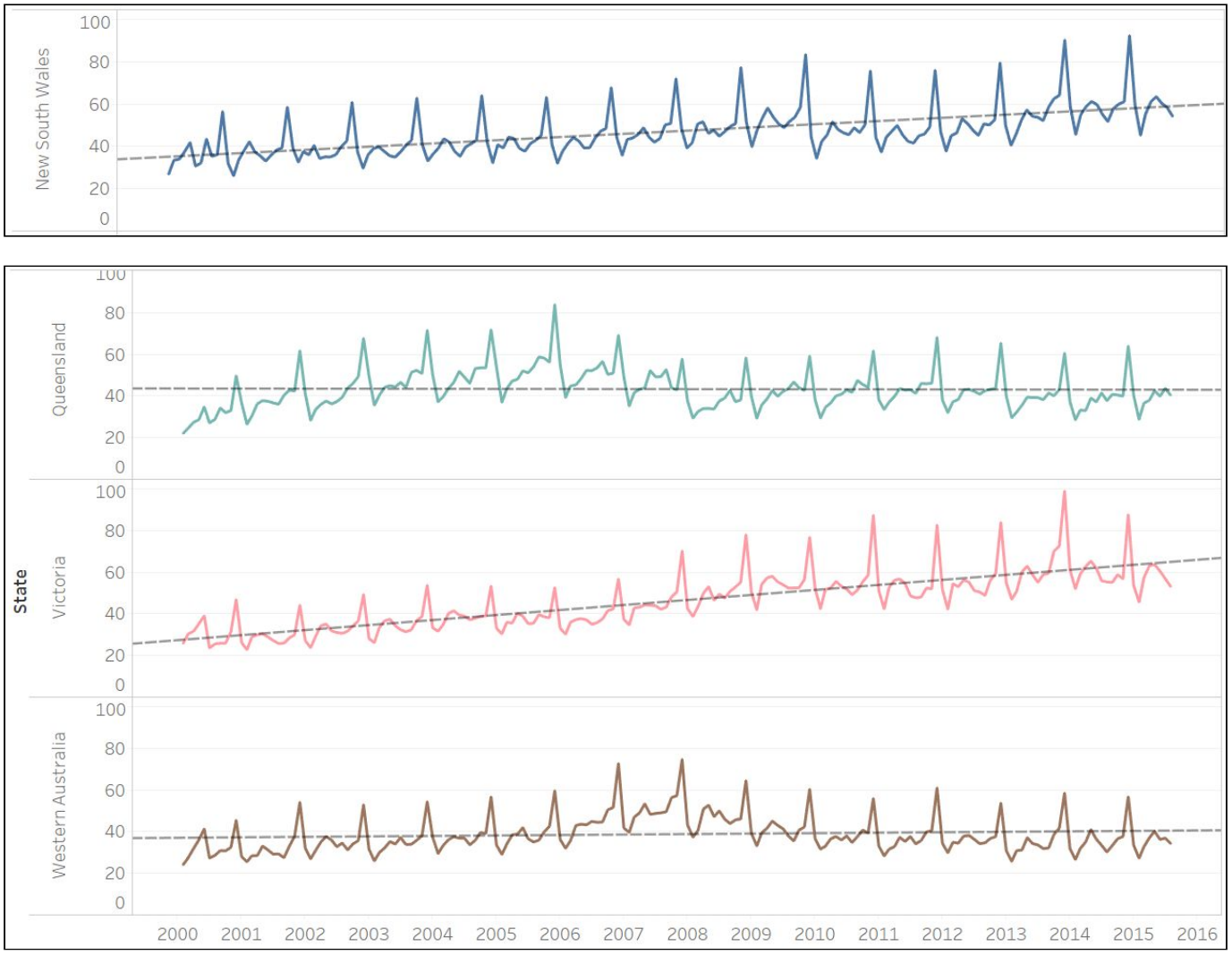


Image: Sales per capita

From above image we can see, in NSW and VIC regardless of population size the industry is growing. Whereas, in QLD and WA the trend line is downwards.

Here we can also compare the industries on basis of per capita sales. On comparing these several things it is concluded that Victoria would be recommended for expansion.

Finally, forecasting these values in graph would help us to analyse the data even further. Below image shows the forecast of this values to the future 5 years.

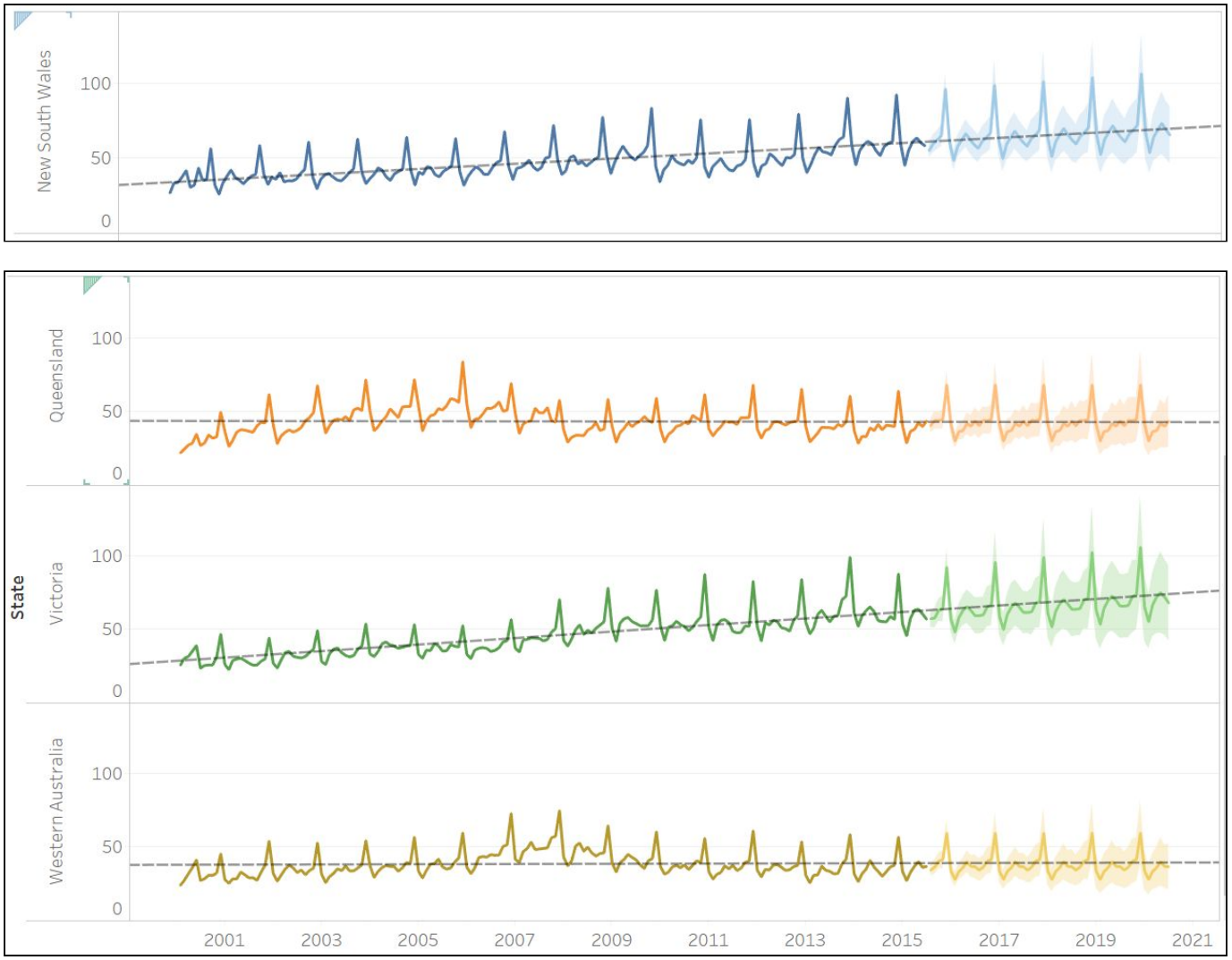


Image: Forecasting of Sales per capita

Conclusion:

From above analysis we can conclude that planning to expand our clothing business in Victoria would be profitable because people individually spending more here in comparison with other states so as they might be demanding more products. Also the forecast shows, if we can maintain and leverage this trend then it will grow as it were and generate more profit in future.