CONESTOGA COLLEGE

January 2024

BUSINESS ANALYTICS

INFO 8136- DESCRIPTIVE ANALYSIS

Practical Assignment #3 - Role of an Analyst

Submitted By

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Metrics:

Several factors influenced finding the best cities to live in Canada, such as the cost of living, employment opportunities, quality of education, healthcare, housing affordability, safety, and transportation. After a thorough review, 3 metrics are decided to find the best cities to move to after graduation.

1. **Employment Opportunities,**
2. **Cost of living (electricity, gas prices, and rental cost), and**
3. **Population per city.**

I have selected the above metrics for their comprehensive coverage of essential aspects that influenced the driving force to select the metrics and selected the year between 2021 to 2023 for analysis.

1. **Employment Opportunities:** As a student, one of the most important factors that influence employment opportunities and the promising job market for my domain is the city. Additionally, the time frame of the last three of the analyses allows me to make fact-based decisions when choosing a city.
2. **Cost of living (electricity, gas prices, and rental cost):** Another important factor considered for analysis is the city's cost of living. It encompasses expenses such as housing, utilities, transportation, gas prices, and other utilities. The last three years of data are taken for analysis to understand the various factors influencing the price, such as policies, political stability, and demographic economy.
3. **Population per city:** The size and composition of the city's population can influence so many factors like employment opportunities, rental cost, lifestyle, and vibrant economy. To understand the growing population and employment opportunities, on the other hand, to understand the city's economic position.

SQL QUERIES:

To understand the data, the refined Excel data are imported to the PostgreSQL database for various query-based analyses. Each metric underwent various SQL analyses to find evident supportive results.

Employment Opportunities:

INPUT:

```
SELECT date, city, SUM(value) AS total_employment
FROM employmentbyprovince
GROUP BY date, city
ORDER BY date, total_employment DESC;
```

OUPUT:

	date integer	city character varying (100)	total_employment numeric
14	2022	Winnipeg	464.10
15	2022	Ottawa	800.20
16	2022	Edmonton	808.50
17	2022	Calgary	878.10
18	2022	Vancouver	1545.80
19	2022	Montreal	2346.70
20	2022	Toronto	3569.30
21	2023	Regina	147.90
22	2023	Halifax	263.60
23	2023	Kitchener-Waterloo	343.70
24	2023	Winnipeg	473.70
25	2023	Ottawa	833.70
26	2023	Edmonton	849.70
27	2023	Calgary	903.50
28	2023	Vancouver	1583.30
29	2023	Montreal	2420.80
30	2023	Toronto	3674.60

Total rows: 30 of 30 Query complete 00:00:00.101

INSIGHTS:

The above results show employment opportunities yearly in cities 2021, 2022, and 2023.

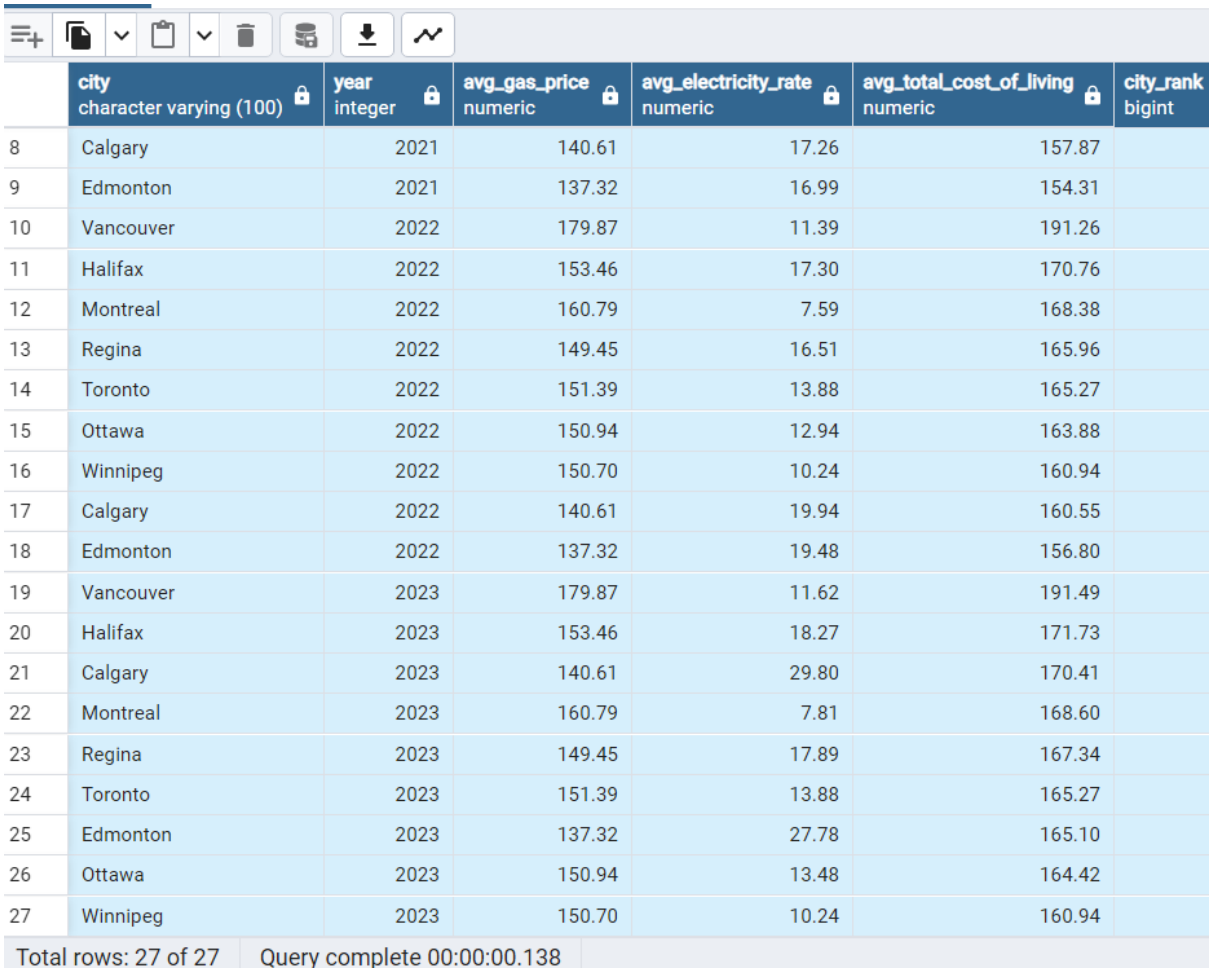
- Toronto and Montreal consistently appear on top of the list in more job opportunities yearly.
- Calgary, Vancouver, and Edmonton also maintained relatively high employment in the following years.
- Cities like Regina, Halifax, and Waterloo-Kitchener show moderate growth over the period.

Cost of living (electricity, gas prices, and rental cost):

INPUT:

```
SELECT c.city,
    er.year,
    ROUND(AVG(gp.cost_of_gas), 2) AS avg_gas_price,
    ROUND(AVG(er.electricity_rate), 2) AS avg_electricity_rate,
    ROUND(AVG(gp.cost_of_gas + er.electricity_rate), 2) AS
avg_total_cost_of_living
FROM public.cities c
JOIN public.gas_prices gp ON c.city_id = gp.city_id
JOIN public.electricity_rate er ON c.city_id = er.city_id
GROUP BY c.city, er.year
ORDER BY er.year, avg_total_cost_of_living;
```

OUTPUT:



	city character varying (100)	year integer	avg_gas_price numeric	avg_electricity_rate numeric	avg_total_cost_of_living numeric	city_rank bigint
8	Calgary	2021	140.61	17.26	157.87	
9	Edmonton	2021	137.32	16.99	154.31	
10	Vancouver	2022	179.87	11.39	191.26	
11	Halifax	2022	153.46	17.30	170.76	
12	Montreal	2022	160.79	7.59	168.38	
13	Regina	2022	149.45	16.51	165.96	
14	Toronto	2022	151.39	13.88	165.27	
15	Ottawa	2022	150.94	12.94	163.88	
16	Winnipeg	2022	150.70	10.24	160.94	
17	Calgary	2022	140.61	19.94	160.55	
18	Edmonton	2022	137.32	19.48	156.80	
19	Vancouver	2023	179.87	11.62	191.49	
20	Halifax	2023	153.46	18.27	171.73	
21	Calgary	2023	140.61	29.80	170.41	
22	Montreal	2023	160.79	7.81	168.60	
23	Regina	2023	149.45	17.89	167.34	
24	Toronto	2023	151.39	13.88	165.27	
25	Edmonton	2023	137.32	27.78	165.10	
26	Ottawa	2023	150.94	13.48	164.42	
27	Winnipeg	2023	150.70	10.24	160.94	

Total rows: 27 of 27 Query complete 00:00:00.138

INSIGHTS:

- Vancouver consistently ranks cities in terms of the high cost of living across all three years.
- In Other cities like Toronto, Halifax, and Montreal, the cost of living is high in all three years, showing that it is a more expensive place to live.
- Cities like Calgary and Edmonton tend to have a low cost of living compared to other cities in Canada.

Population per city:

INPUT:

```
SELECT
    city,
    population,
    landarea,
    population_density,
    ROW_NUMBER() OVER (ORDER BY population_density DESC) AS
city_rank
FROM (
    SELECT
        c.city_id,
        c.city,
        p.population,
        p.landarea,
        p.population / p.landarea AS population_density
    FROM
        public.population p
    JOIN
        public.cities c ON p.city_id = c.city_id
) AS subquery
ORDER BY
    population_density DESC
```

LIMIT 10;

OUTPUT:

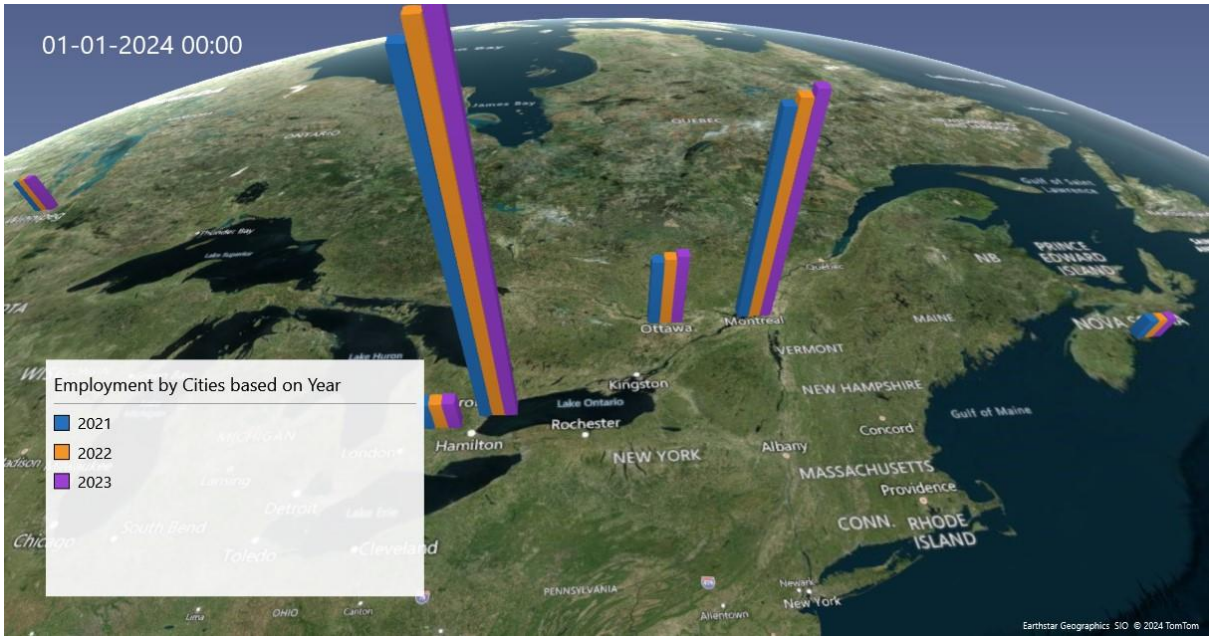
	city character varying (100)	population integer	landarea numeric (10,2)	population_density numeric	city_rank bigint
1	Vancouver	662248	115.18	5749.6787636742490016	1
2	Montreal	1762949	364.74	4833.4402588144979986	2
3	Toronto	2794356	631.10	4427.7547139914435113	3
4	Kitchener	378321	200.87	1883.4121571165430378	4
5	Winnipeg	749607	461.78	1623.2989735371822080	5
6	Calgary	1306784	820.62	1592.4349881796690307	6
7	Edmonton	1010899	765.61	1320.3837462938049399	7
8	Regina	226404	178.81	1266.1707958167887702	8
9	Ottawa	1017449	2788.20	364.9124883437343089	9
10	Halifax	439819	5475.57	80.3238749573103805	10

INSIGHTS:

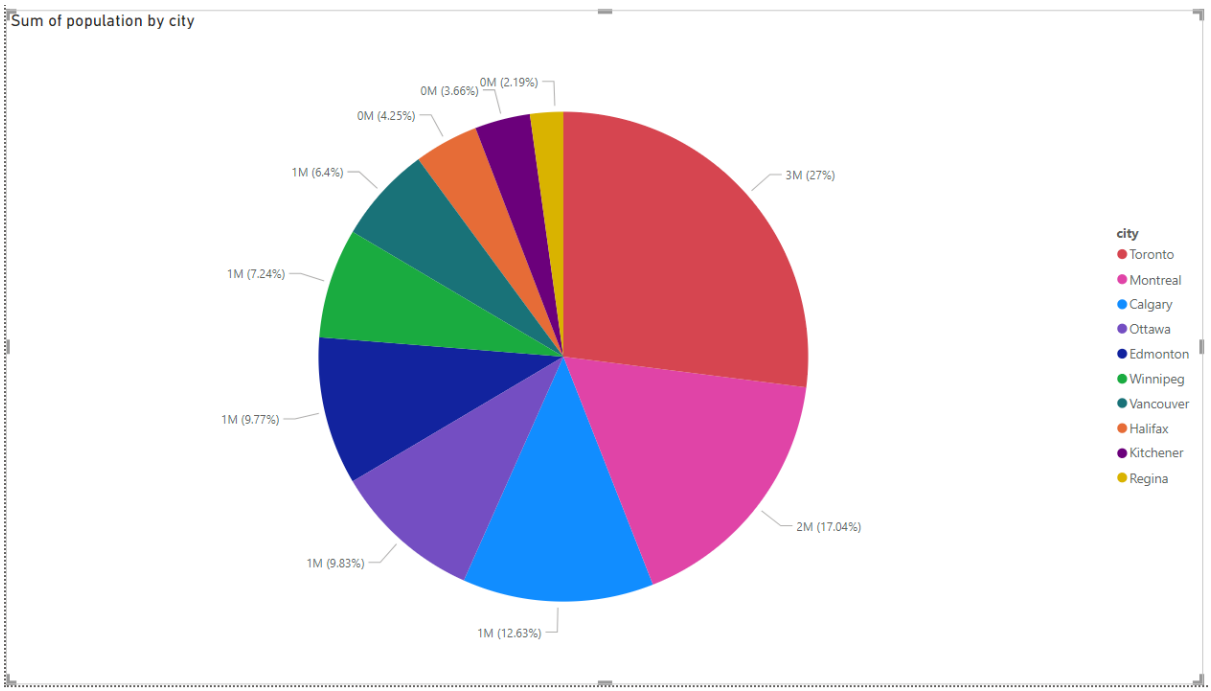
- Vancouver ranks the highest population density at approximately 5749 people per square kilometre.
- Montreal and Toronto are closely behind Vancouver by 4833 and 4427 people per square kilometre. These city's population growth reflects the status of significant economic development in these cities.
- Despite being the capital of Canada, Ottawa exhibits a lower population density than other major cities.
- Whereas Halifax shows only 80 people per square kilometre.

GIS MAP:

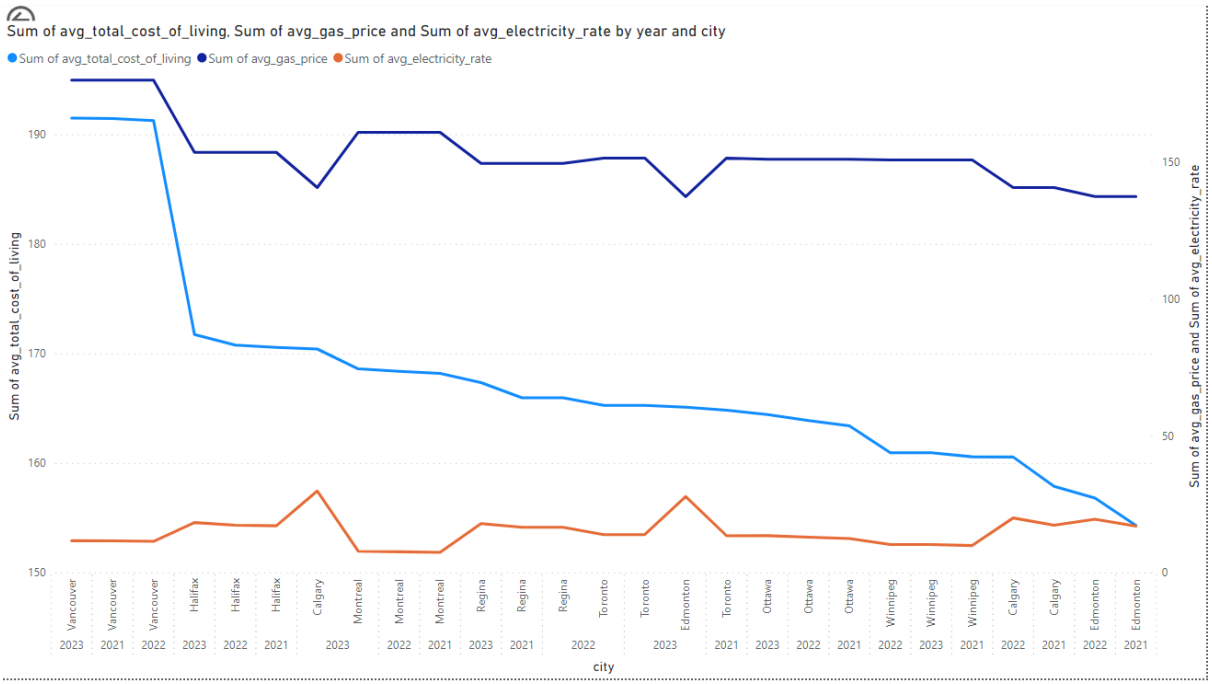
A Geographic information system was generated to show each city's employment growth between 2021 and 2023. In these 3 maps, we can see the employment growth in Toronto, Montreal, and Ottawa; each color of the bar represents 2021 to 2023.



Pie chart Using Power BI:



Line Chart Using Power BI:



Video Tour:

To present the information more interactively, I created a power map 3D video that was more interactive. Also, I have attached that video along with the assignment submission.

Conclusion:

As per the analysis, the employment opportunities, cost of living, and population per city data show that Toronto, Montreal, and Vancouver are the best places to move after graduation. Due to huge population growth, the city's economic development, cultural diversity, and employment opportunities are very high compared to any other Canadian cities in Canada.

On the other hand, Calgary and Edmonton have a lower cost of living and considerable employment opportunities than any other cities. If any job

opportunities exist, this may give some financial freedom to the migrants and students.