

Capstone Project

Health Canada – Workforce Forecasting

Team 7

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Introduction:

The project outlined herein delves into a comprehensive analysis of workforce forecasting for Health Canada, aimed at addressing critical organizational needs through informed decision-making. With a focus on meticulous study and data analysis, our endeavour is to provide actionable insights to enhance operational efficiency and resource allocation within Health Canada.

At its core, this project aims to dissect the current state of Health Canada's workforce dynamics, identifying key trends, challenges, and opportunities that shape its staffing requirements. By leveraging advanced methodologies such as Exploratory Data Analysis (EDA), Data Modeling, and Data Visualization using Microsoft Power BI, we seek to gain a nuanced understanding of the organization's diverse workforce landscape.

Central to our mission is the fulfilment of the client's need for predictive job forecasting across various categories, including geographical requirements, departmental allocations, and other crucial parameters influencing workforce dynamics. Through applying sophisticated techniques such as time series analysis and decomposition tree models, we endeavour to deliver the best story-telling visuals tailored to Health Canada's specific needs.

This project represents a collaborative effort to harness industry best practices and innovative tactics to meet the challenges faced by Health Canada in optimizing its workforce planning strategies. By offering strategic recommendations grounded in robust data analysis, we aim to empower Health Canada with the tools necessary to navigate its staffing requirements effectively and efficiently.

Opportunity Restatement:

The opportunity provided by the client, Health Canada, entails the need for an in-depth analysis and predictive forecasting of workforce requirements. This project addresses the challenge of accurately predicting job demands within the organization, considering various factors such as geographical requirements, department categories, and other significant parameters affecting workforce allocation.

The main problem at hand is aligning NOC insights within internal needs for job forecasting within Health Canada. The organization requires a solution that can anticipate workforce needs based on factors like geographical distribution, departmental requirements, time series analysis, NOC (National Occupational Classification) levels, and provincial analysis down to the city level.

The challenge is to develop a robust forecasting system that can effectively predict future workforce demands, optimize resource allocation, and ensure that Health Canada operates efficiently in meeting its staffing needs across diverse departments and locations.

Logical Solution:

- Identifying key drivers: By looking at historical data, we can determine the key drivers that influence workforce demand.
- Scenario Planning: Developing different scenarios based on varying assumptions about the future.
- Demand Forecasting: Using statistical techniques like Time Series Analysis to forecast.
- Gap Analysis: Comparing forecasted demand with projected supply to identify any gaps in the workforce.

The rationale behind these approaches

- Data-Driven: By relying on historical data and statistical analysis, this approach ensures that forecasts are based on objective information rather than guesswork.
- Flexible: Scenario planning allows for flexibility in responding to different future scenarios, ensuring that organizations are prepared for various possibilities.
- Iterative: Continuous monitoring and adjustment ensure that forecasts remain relevant and accurate in the face of changing circumstances.

Alternative Approaches

- Qualitative Forecasting: Instead of relying solely on quantitative data, providing qualitative methods such as expert opinions and surveys could be used to complement quantitative analysis.
- Bottom-Up Forecasting: Instead of starting with aggregate workforce demand forecasts, this approach involves forecasting at the individual job level and aggregating up to obtain overall workforce projections.

Physical Solution:

Our Client, Mr. Chris Thompson has provided the dataset, crucial for the project's progress. This dataset will serve as the foundation for our analysis and decision-making processes, ensuring alignment with the project objectives and client requirements.

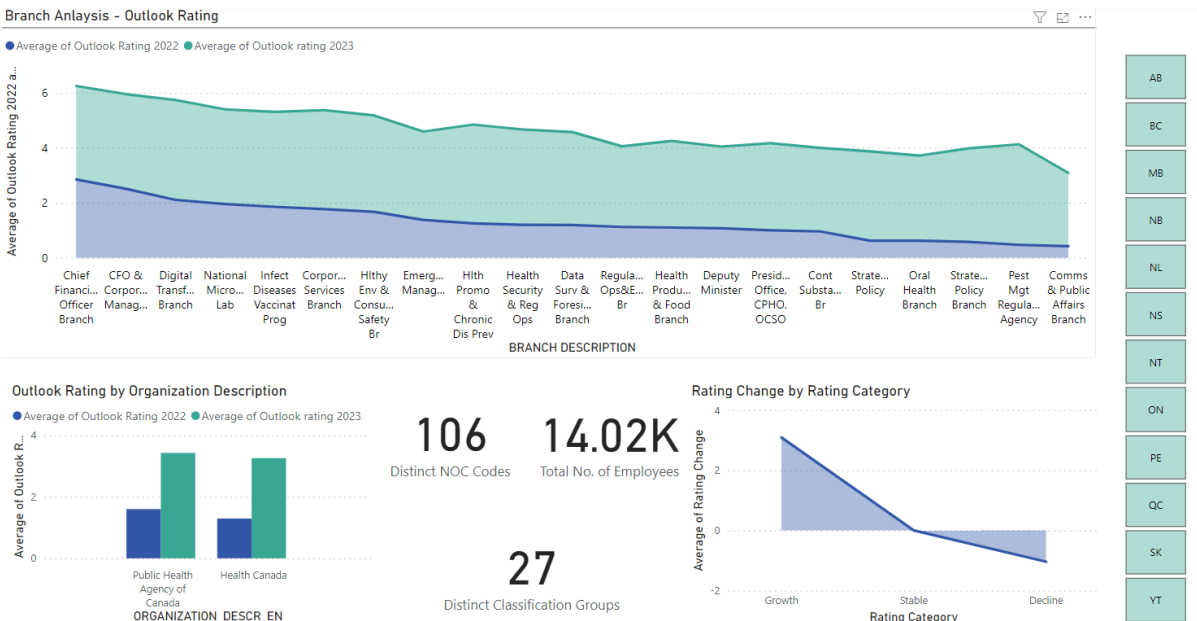
We utilized Tableau Prep Builder to clean the dataset provided for our project. This tool streamlined the process, allowing me to efficiently handle data preparation tasks such as filtering, joining, and restructuring. By leveraging Tableau Prep Builder's intuitive interface and powerful functionalities, I was able to ensure that the dataset was refined and ready for analysis, ultimately contributing to the project's success.

We integrated Power BI for visualization, harnessing its robust features to conduct comprehensive time series analysis and derive valuable insights from the dataset. Leveraging Power BI's intuitive interface and diverse visualization options, we were able to present complex temporal trends and patterns effectively. Furthermore, we utilized Jupyter Notebook for coding tasks related to time series analysis, enabling us to implement advanced algorithms and statistical models for deeper exploration and interpretation of the data. This combination of Power BI and Jupyter Notebook allowed us to leverage the strengths of both platforms, facilitating a thorough analysis of the dataset and enhancing the overall quality of our findings.

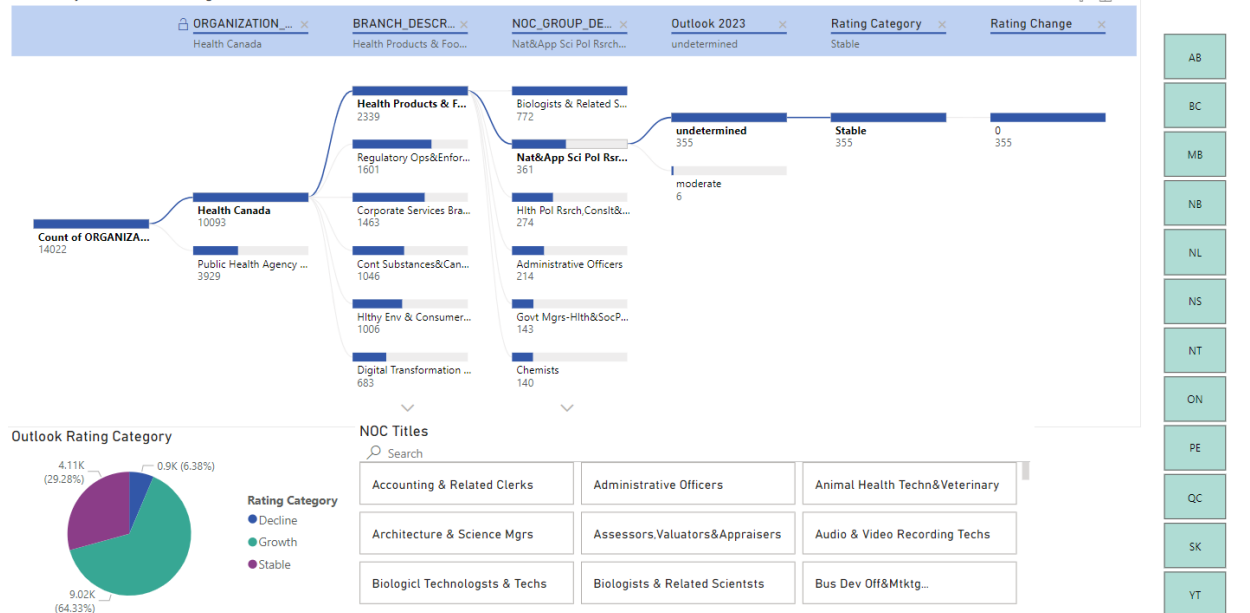
Demo Files:

<https://github.com/MukeshChadaram/Capstone-Project---Health-Canada---Workforce-Forecasting>

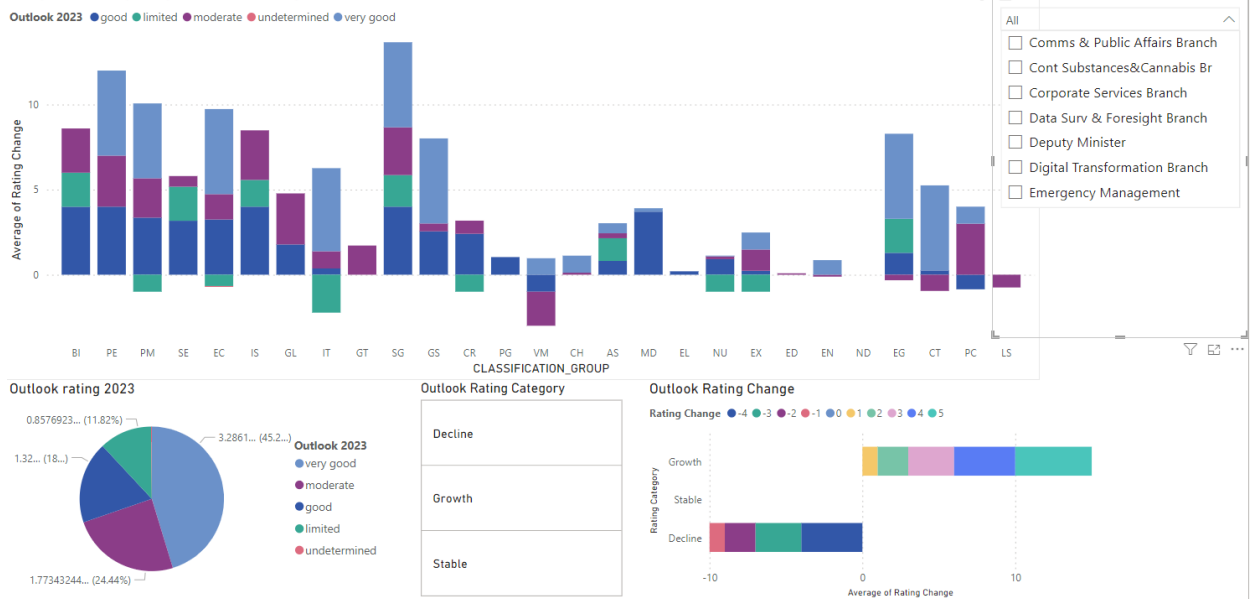
Results and Analysis:



NOC Analysis - Outlook Rating

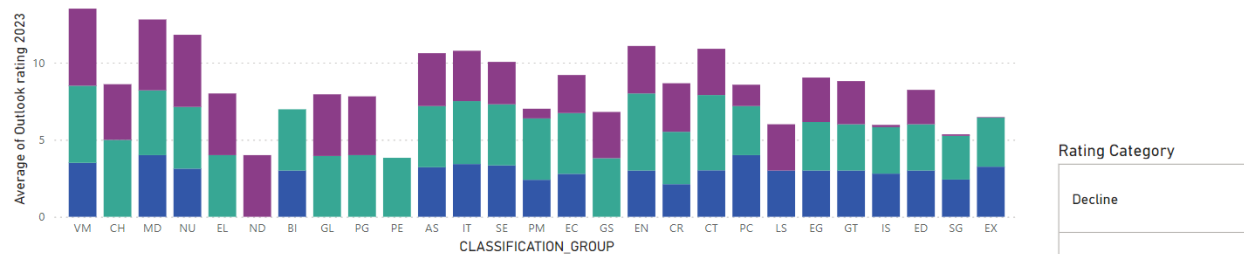


Occupational Group Analysis - Outlook Rating



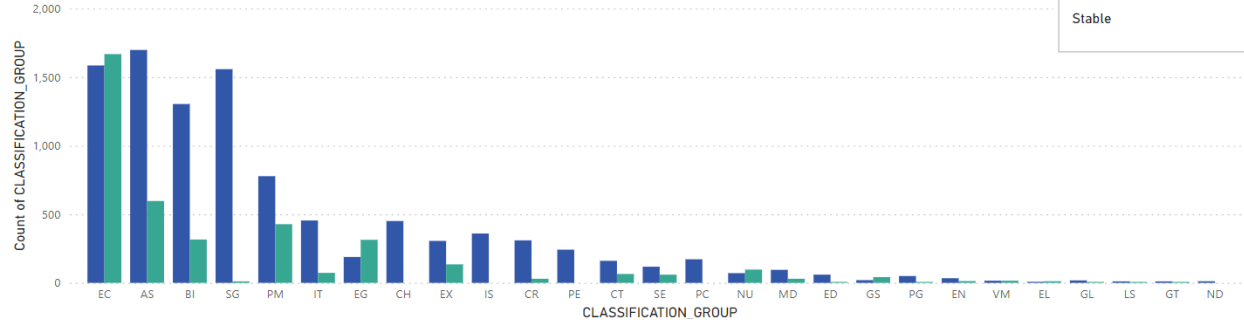
Detailed Occupational Group Analysis - Outlook Rating

Rating Category ● Decline ● Growth ● Stable

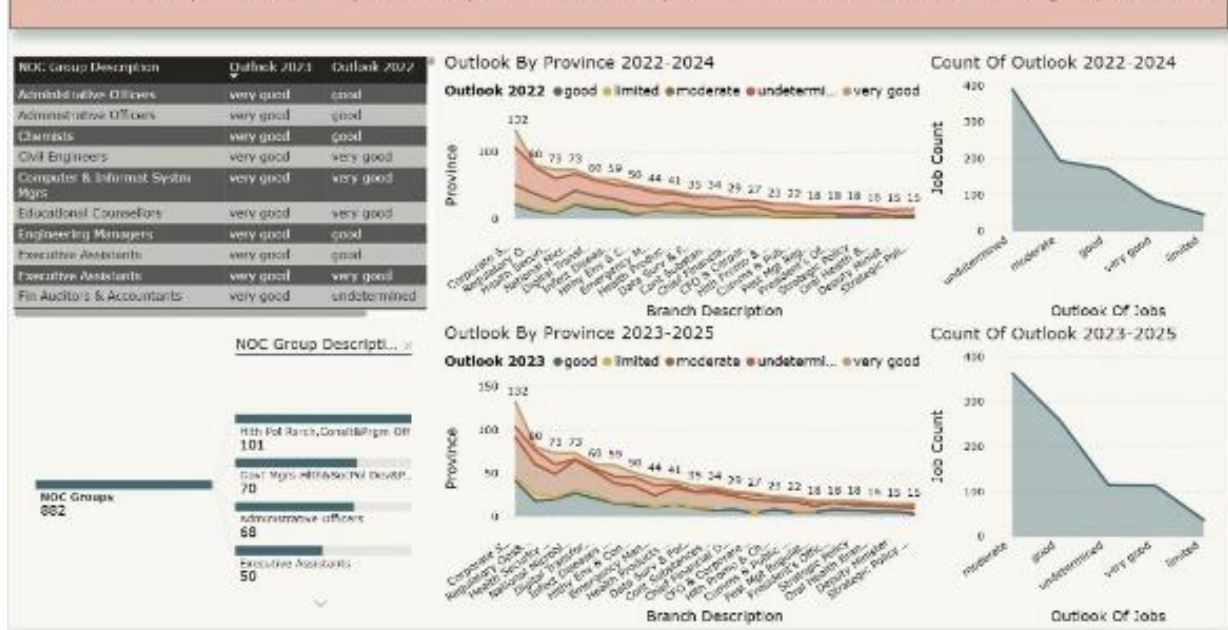


Occupational Group Analysis - Organization Description

ORGANIZATION DESCRIPTION ● Health Canada ● Public Health Agency of Canada



Time Series Analysis of Outlook by NOC Group and Branch Description - Health Canada & Public Health Agency of Canada



Provinces show a peak in "very good" outlooks around 2023, suggesting favourable conditions or initiatives that may be temporary or expected to change in subsequent years.

There is a positive trend in job outlooks from 2022 to 2023 among various NOC groups, indicating potential growth or stability in these sectors.

The overall decrease in the count of jobs across all outlook categories could indicate a contraction in the workforce or a shift in job classifications over time.

There is a sharp decline in the average rating change, suggesting that most categories have seen a decrease in ratings.

The categories are colour-coded at the bottom with the terms "Growth," "Stable," and "Decline," with Decline being the predominant category, based on the trend shown in the graph.

Proposed Data Story:

In response to the dynamic healthcare landscape, Health Canada initiated a workforce forecasting project to ensure optimal resource allocation. By analyzing comprehensive datasets, leveraging predictive modelling techniques, and employing visualization tools, the project aimed to anticipate future workforce needs and enhance healthcare service delivery.

Methodology

Data analysis encompassed workforce outlooks across various Geographical areas. Predictive modelling techniques, including time series analysis and machine learning, were utilized to forecast future staffing requirements with precision. Visualizations and Dashboards created using Power BI, provided stakeholders with actionable insights.

Significance

The findings empower Health Canada to proactively address staffing needs and optimize resource allocation. By anticipating future workforce requirements and identifying potential shortages, the project fosters adaptability and resilience within the healthcare system. Data-driven decision-making enhances strategic planning, ensuring readiness to navigate future challenges.

Conclusion

The workforce forecasting project equips Health Canada with the tools and insights needed to navigate the evolving healthcare landscape. Through data-driven analysis and predictive modelling, the project facilitates proactive workforce planning and strategic resource allocation, enabling Health Canada to meet the needs of a dynamic healthcare environment effectively.

Value and Lessons Learned:

In preparing a document on workforce forecasting, several key lessons have been identified that can enhance future planning and strategy:

Data Quality

Accurate and comprehensive data collection and analysis are crucial. High-quality data underpins informed decision-making, enhancing the reliability and effectiveness of workforce forecasts.

Flexibility

The dynamic shifts observed in job market trends highlight the need for adaptable strategies that can swiftly respond to changing economic conditions and technological advancements.

Continuous Improvement

This involves the regular refinement of strategies and methodologies based on iterative assessments and feedback, ensuring that workforce planning remains aligned with current and future needs.

Long-Term Vision

A strategic focus on long-term goals is essential, especially given the temporary nature of some positive trends. Long-term planning helps anticipate future challenges and ensures sustainable growth and stability in the workforce.

Main Features Wished Implemented:

Skill Gap Analysis

Clustering can help identify areas where there may be shortages or surpluses of certain skills within the workforce.

Scenario Planning

Clustering data facilitates scenario planning for workforce-related challenges such as demographic shifts, economic fluctuations, or changes in industry demand.

Labor Market Analysis

By clustering demographic data, businesses can gain a deeper understanding of the labour market dynamics within different metropolitan areas. This includes factors such as workforce size, employment trends, job turnover rates and wage levels.