

A

Project report on

HR DATA ANALYSIS

Submitted in fulfilment of the award of the

Master of Computer Applications

in

Data Science

by

K Ranga Sai

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Under the esteemed guidance of

Dr.V.HARSHA SHASTRI

HOD, Department of MCA



DEPARTMENT OF MCA IN DATA SCIENCE

SCHOOL OF INFORAMTICS

AURORA HIGHER EDUCATION AND RESEARCH ACEDAMY

(Deemed to be University)

Parvathapur, Uppal, Hyderabad-500 098

(2024-25)

CERTIFICATE

This is to certify that the project report entitled **HR DATA ANALYSIS** has been submitted by **K Ranga Sai** holding roll no **232P4R2059** in fulfilment for laboratory project in Business Intelligence is a record of bonafide work carried out by them under my guidance and supervision.

Date:
Hyderabad

Dr.V.HARSHA SHASTRI
HOD
Department of MCA
School of Informatics

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ABSTRACT

This Power BI project is done to provide full understanding of workforce dynamics in this company so as to make good decisions and long-term planning based on strategic data. Ten critical analyses will form the backbone of the dashboard, providing insights into employee demographics, performance, compensation, and growth trends in depth. It will be used as a tool for HR leaders and decision-makers to evaluate diversity, productivity, and financial efficiency while promoting data-driven workforce optimization.

Advanced functionalities of Power BI are used, including dynamic filtering, interactive visualizations, and robust analytics models. The data is divided by departments, countries, and demographic groups so as to find out the most salient patterns or trends. Histograms, scatterplots, and scorecards are used to provide data in such a way that can be used and acted on. For instance, histograms might be used in the display to demonstrate how distribution of people differs according to their age across the different departments while a scatter plot would be appropriate in evaluating how the performance in an organization may correlate with its salary. Cross filtering with drill-through facilities enables the user to concentrate the analytics on particular metrics, regions, or subsets of employees; thus, a custom analytical experience is ensured.

Key insights reveal the most important workforce trends and performance gaps. Departmental analysis reveals uneven workforce distribution, which in certain areas can be optimized. Gender distribution data indicates the gap that has been existing within some departments that offer support towards focused inclusion. A salary-related analysis indicated differences in pay and a focus on the most paid employee within each country in addition to which department is contributing the most for the company's financials. A correlation of performance with its respective salary may indicate a lack of fairness or justify merit-based compensation. The India vs. New Zealand scorecard will be a regional performance comparison with strengths and weaknesses. Finally, the company growth trend visualization will indicate an upward trajectory, thereby further increasing confidence in organizational development.

Key words:

Employee Insights, Workforce Analytics, Power BI Dashboard, Gender Distribution, Salary Analysis, Performance Metrics, Regional Comparison, Growth Trends, Data Visualization, Strategic.

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INTRODUCTION:

The project will aim to create a complete, interactive Power BI dashboard that gives in-depth insights into the company's workforce. This dashboard will analyze such critical factors as the distribution of employees across departments, gender diversity, salary structures, performance metrics, and regional comparisons. By emphasizing such critical aspects, the project will assist HR and management teams in finding patterns, making data-driven decisions, and aligning human resources with general broader organizational goals. Moreover, the dashboard aims to make complex data more accessible and actionable for decision-makers through the use of bar charts, scatter plots, and scorecards.

The background of this project is based on the increasing demand for businesses to apply data-driven approaches to human resource management. Companies deal with enormous volumes of employee data, impossible to interpret through human mind. In such a scenario, if insights are not clearly determined, it can be tough to identify trends or even optimize performance, or even address potential disparities within the workforce. Power BI is the excellent opportunity to translate raw employee data into meaningful insight through robust tools for analytics, along with some great visualization features. It harnessed up the features by building an interactive and user-friendly dashboard to streamline workforce analytics towards making it even more efficient and effective.

The scope of the project encompasses several major categories for workforce analytics. One, it looks at departmental insights, which is an examination of how employees are spread out among the departments. This expands to demographics, which include gender and age diversity, which offers insights into the diversity initiatives led by the company. Finally, it comprises compensation analysis that will compare the salary ranges of departments and point out the highest paid. The largest part of the dashboard will comprise performance metrics that show trends in employee performance and its correlation with salary. This project compares regional data, with the focus being on performance differences between countries such as India and New Zealand. Lastly, the growth trends section will depict how the company's workforce and performance have changed over time.

This project aims to help the company make informed decisions regarding its workforce. The dashboard gives HR teams and management clear insights into employee data, supports better planning and optimization, and develops strategies based on the analysis.

LITERATURE SURVEY:

The role of Human Resources has dramatically changed from a traditional, administrative function in organizations to one that is becoming more strategic in nature. Indeed, some of the earlier research by Lawler et al. (2003) makes this distinction between HR metrics, focusing on efficiency and effectiveness, and HR analytics, which uses statistical and predictive techniques to measure the causal effect of HR practices on business outcomes. HR analytics has gained importance in enhancing organizational performance, especially in talent management, and aligning HR practices with business strategy (Boudreau & Ramstad, 2003). However, the adoption of HR analytics has been slow, with Marler and Boudreau (2017) reporting that only 16% of organizations are leveraging it to its full potential. Despite skill gaps, lack of managerial buy-in, and fragmented data systems, HR analytics has been shown to positively impact productivity and competitiveness.

In addition, frameworks such as the LAMP model (Logic, Analytics, Measures, Process) and HR Scorecard offer structured approaches to data-driven decision-making, emphasizing the need for strategic alignment between HR practices and organizational goals. Mondore et al. (2011) also recommended a six-step process of HR analytics implementation, including identifying key outcomes, integration of cross-functional data, and cause-effect analysis. In practice, applications in regression analysis and structural equation modeling have been successful in succession planning and workforce optimization, and also employee engagement. Predictive HR analytics, as pointed out by Cascio & Boudreau (2016) and Davenport et al. (2020), thus improves decisions by predicting the behavior of employees, recruitment optimization, and also providing improvements on retention. Human Resource Information Systems have the key role of collecting and analyzing the workforce data to make organizations use analytics (Bassi, 2011).

Recently, more emerging areas in this field of study include diversity and inclusion analytics. For example, Hunt et al. 2015 note that workforce diversity positively impacts innovation and organizational performance. However, areas such as privacy, bias, and transparency with regard to the data remain highly challenging (Wright & Nishii, 2013).

It must be acknowledged that while tremendous ground has been gained in embracing HR analytics, it is yet not fully utilized and developed for potential areas. A case in point is predictive analytics in HR functions, where more emphasis should have been put with regard to real decision-making operation in recruitment, retention, and talent management.

Prediction analytics indicates potential; however, its implementation and scalability among various industries and organizational sizes and structures remain unexplored areas of research. Furthermore, though diversity and inclusion analytics are considered an emerging area, not many studies discuss how these analytics can be systematically incorporated into the larger HR strategies to better the organizational outcomes. Moreover, existing literature has often ignored the issues of data privacy and bias in the application of HR analytics, especially in sensitive areas like predicting employee behavior and performance assessment. It is through this avenue that the linkage of HR metrics with strategic insights and actionable decision-making remains relatively underexplored, especially how HR can be integrated more effectively in the decision-making process of top management.

The scope of this project is to close these gaps through the development of an HR analytics dashboard on Power BI, giving actionable insights to key workforce metrics. Focusing on the convergence of predictive analytics, diversity, and inclusion into real-time performance data, it helps bridge gaps between HR practice and organizational strategy. The data from the dashboard will help decide upon the talents available, provide means to perform and optimize your workforce, and allow for determining the compensation package in place for those employees. The project will ensure transparency and trust in the analytics process, providing a framework through which HR will transition from being an administrative function to a more strategic, data-driven partner in organizational success. Further, it addresses the challenges relating to data privacy and bias.

METHODOLOGY:

The methodology for this HR analytics project involves a step-by-step process to collect, analyze, and present employee data using Power BI, making it easy for HR teams to understand and act on key workforce insights.

❖ Data Collection

The first step is gathering data from HR systems like payroll, performance reviews, and employee records. This data includes details such as age, gender, department, salary, and performance scores. Collecting data from multiple sources ensures a complete picture of the workforce.

❖ Data Preparation

The collected data is cleaned and organized to make it usable. This involves fixing

missing or incorrect values, removing duplicates, and ensuring the format is consistent. Clean data is important to get accurate results in the next steps.

❖ **Data Integration and Transformation**

The cleaned data is uploaded into Power BI, where it is prepared for analysis.

Calculations are made to find important metrics like average salary, performance scores, and employee turnover rates. The data is also structured to track changes over time, like monthly or yearly trends.

❖ **Dashboard Development**

In Power BI, visualizations such as bar charts, line graphs, and scatter plots are created to show data insights clearly. Filters are added, so users can explore specific details, like gender distribution in a department or salary ranges for a role.

❖ **Predictive Analytics**

Machine learning models are used to predict outcomes, like which employees might leave the company or how performance is linked to salary. These predictions help HR teams make better decisions.

❖ **Testing and Deployment**

The dashboard is tested to ensure it's accurate and user-friendly. After testing, it's shared with HR teams, and training sessions are held to teach them how to use it effectively.

❖ **Maintenance**

The dashboard is updated regularly with new data and user feedback to keep it relevant and useful over time.

REQUIREMENTS SPECIFICATION:

Hardware:

- PROCESSOR: 12th Gen Intel Core i5 with Graphics
- SYSTEM PROCESSOR SPEED: 1.30 GHz
- INSTALLED RAM: 8.00 GB
- EDITION: Windows 11 Home Single Language
- System type 64-bit operating system, x64-based processor

Software:

- **Power BI**

IMPLEMENTATION:

The implementation of this HR analytics project would primarily focus on designing an interactive dashboard using Power BI, which illustrates key workforce metrics. These involve employee demographics, performance, distribution of salary, and diversity metrics. First and foremost, acquire data from information systems that HRs are adopting in the various organizations and ensure proper cleaning to improve consistency and accuracy.

All of the data imported into Power BI will be transformed by applying calculated fields and aggregations to give an idea about summarizing all key metrics. Distribution of employees, age demographics, salary trends, and growth in the company will be visualized with the use of bar charts, histograms, scatter plots, and line graphs. Users will be able to drill down to specific variables, such as department or gender, to gain further insights through the use of filters.

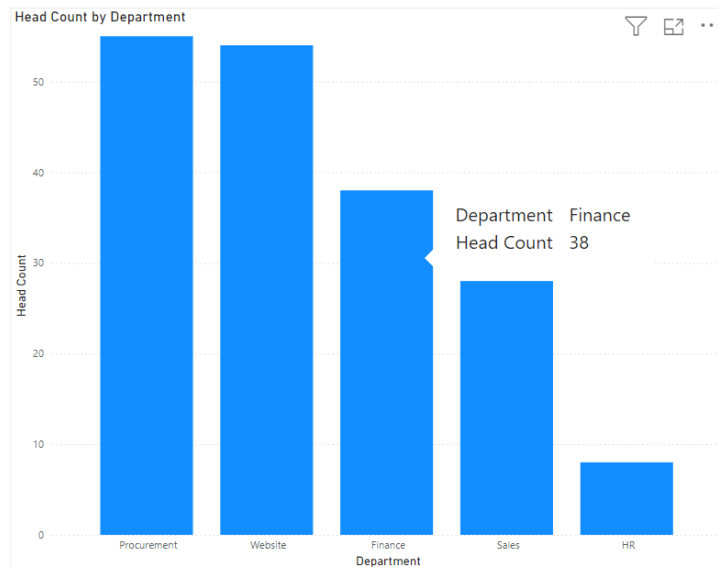
The predictive analytics will be utilized to forecast the employee outcome of turnover, and it would use the technique of machine learning regression analysis. A section on diversity and inclusion metrics will be established to examine the relationship between diversity and team performance.

Once developed, the dashboard is tested for precision and performance accuracy. It shall then be put into use as HR teams learn how to put it to practice. Maintenance is done regularly by updating the same to keep on track with ever-changing trends or requirements.

RESULTS:

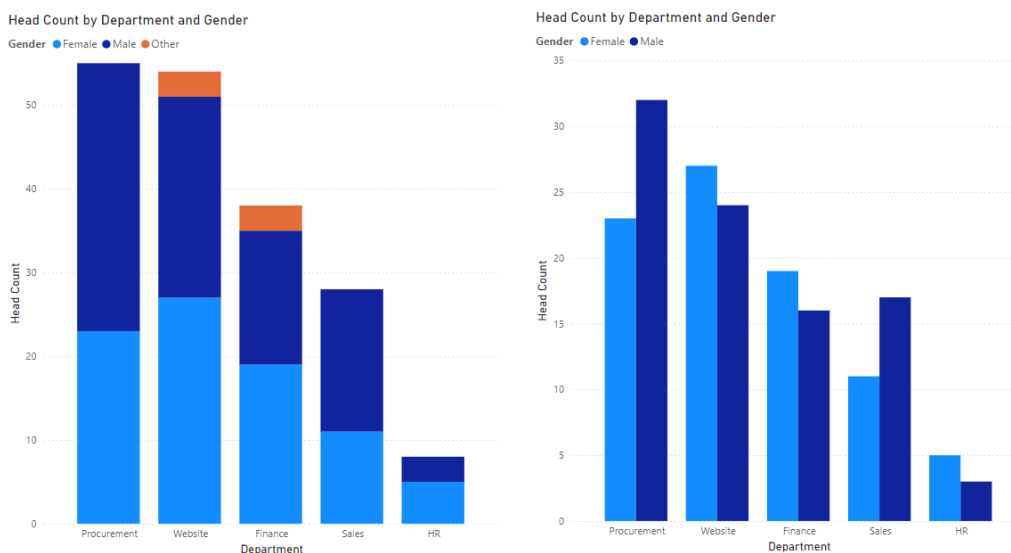
1. How many people are there in each department?

To determine the staff count per department, use a bar chart or tree map. Ensure your data includes EmployeeID and Department columns. Create a measure, CountEmployees = COUNT(EmployeeID), to calculate the total employees. Set Department on the axis and use the CountEmployees measure for the values. This visualization provides a clear view of department sizes.



2. Gender distribution by department

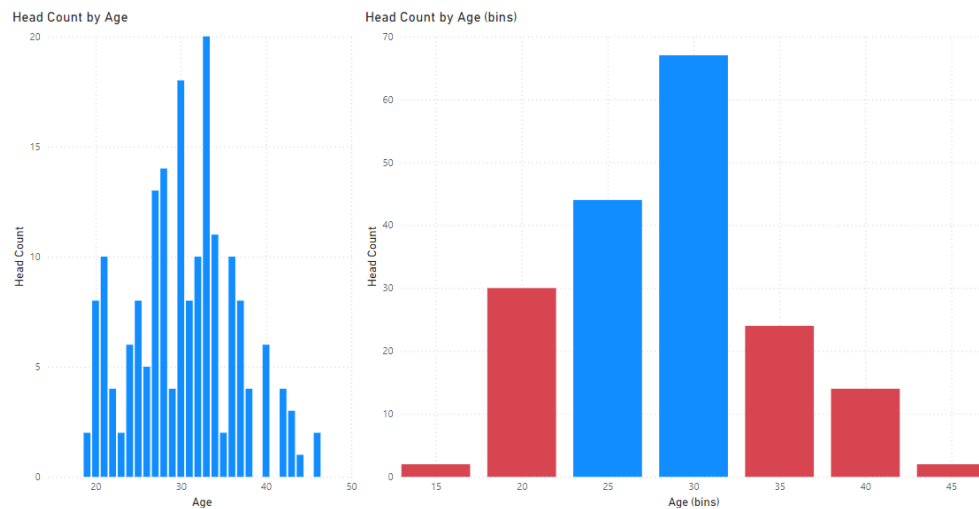
A stacked or clustered bar chart is ideal for visualizing gender distribution. Include the Gender and Department columns. Place Department on the axis and Gender as the legend, with a measure, GenderCount = COUNT(EmployeeID), for values. This chart helps identify the gender composition within each department.



3. Age spread of our staff (histogram)

To analyze the age distribution, calculate age using a formula like $\text{Age} = \text{YEAR}(\text{TODAY}()) - \text{YEAR}(\text{DOB})$. Use a histogram where Age is on the X-axis (binned) and the count of

employees is on the Y-axis. This visualization highlights the demographic spread of your workforce.



4. Min / max / average salary in each department

A table or card visualization works well for this analysis. Use Department and Salary columns to create measures such as MinSalary = MIN(Salary), MaxSalary = MAX(Salary), and AvgSalary = AVERAGE(Salary). Display these values in a table grouped by Department, providing a quick comparison of salary ranges.

Department	min salary	max salary	avg salary
Finance	48170	115440	72,472.63
HR	45510	119110	89,650.00
Procurement	37920	115920	82,345.00
Sales	36040	112780	67,866.43
Website	33920	118840	78,753.70
Total	33920	119110	77,366.52

Country

IND

NZ

5. Top earners in each country

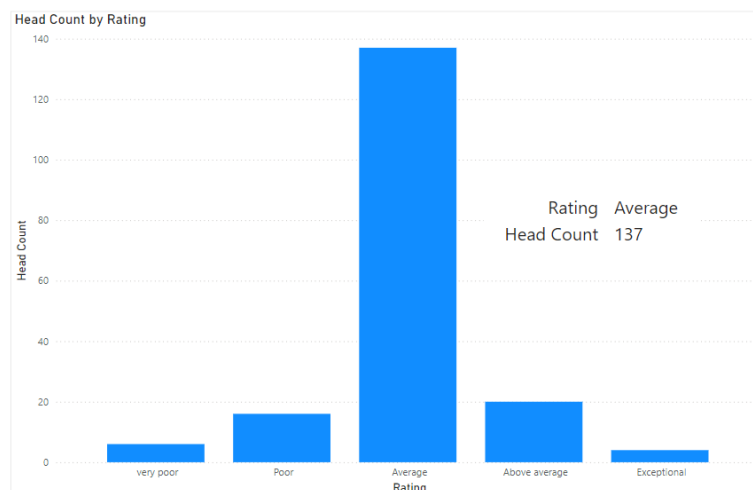
To showcase the top earners by country, use a table or matrix. Include Country and Salary columns and create a measure, Rank = RANKX(ALL(EmployeeID), Salary, DESC). Filter the table to display only the top-ranked employees for each country, highlighting the highest earners.

Name	Sum of Salary
Anjushri Chandiramani	\$1,19,110
Lalitchandra Vadali	\$1,18,840
Kaishori Harathi Kateel	\$1,18,100
Sarayu Ragunathan	\$1,15,920
Vasavi Veeravasrapu	\$1,15,440
Total	\$5,87,410

Name	Sum of Salary
Benny Karolovsky	\$1,15,440
Ewart Laphorn	\$1,19,110
Roddy Speechley	\$1,15,920
Tawnya Tickel	\$1,18,840
Valentia Etteridge	\$1,18,100
Total	\$5,87,410

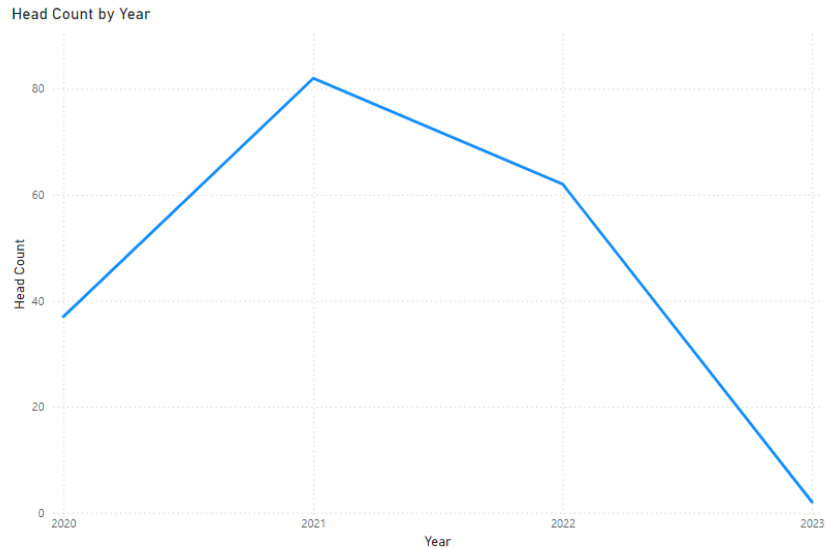
6. Performance spread (sort by column)

A simple table visualization can sort employees by their performance scores. Include columns such as EmployeeID, PerformanceScore, and other relevant data. Enable sorting by the PerformanceScore column to display a clear ranking of employee performance.



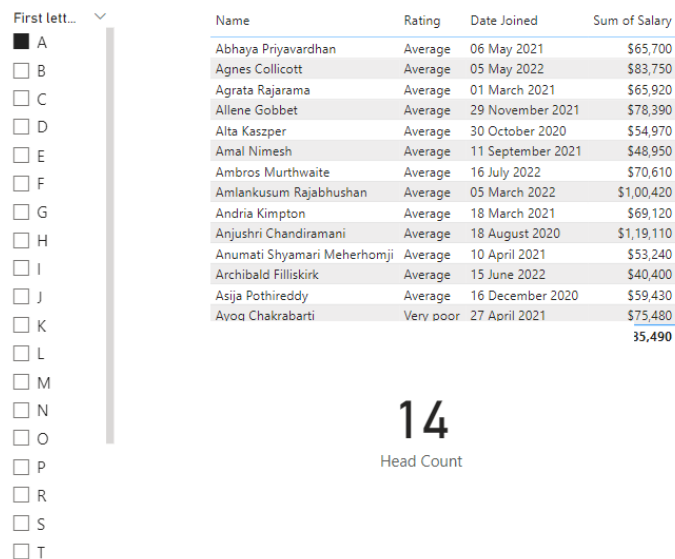
7. Company growth trend

To analyze growth, use a line or area chart. Group data by JoiningDate or Year to observe trends in hiring over time. Create a measure, NewHires = COUNT(EmployeeID), to count hires for each time period. This chart shows how the company's workforce has evolved.



8. Employee filter (by starting letter)

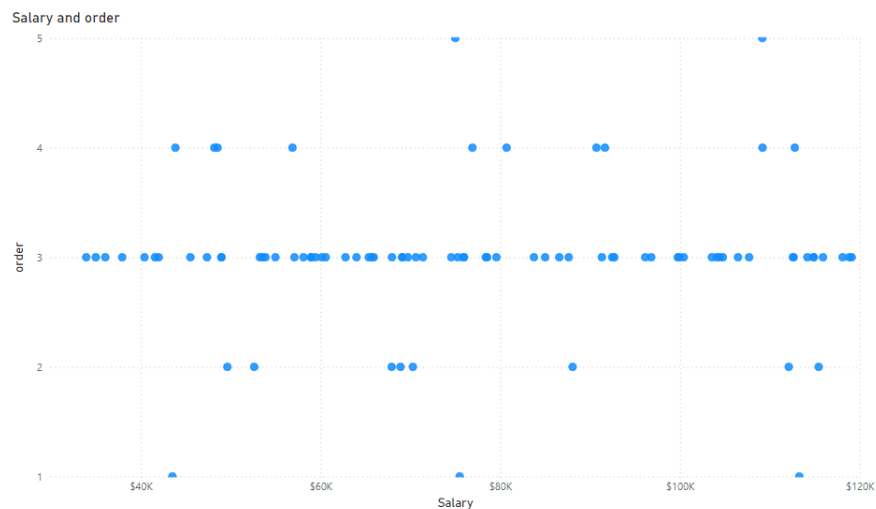
To allow filtering employees by their names, include a slicer. Use the EmployeeName column and set the slicer to filter "Text starts with." This feature enables users to quickly find employees whose names begin with specific letters.



9. Performance vs. salary – Is there any relationship?

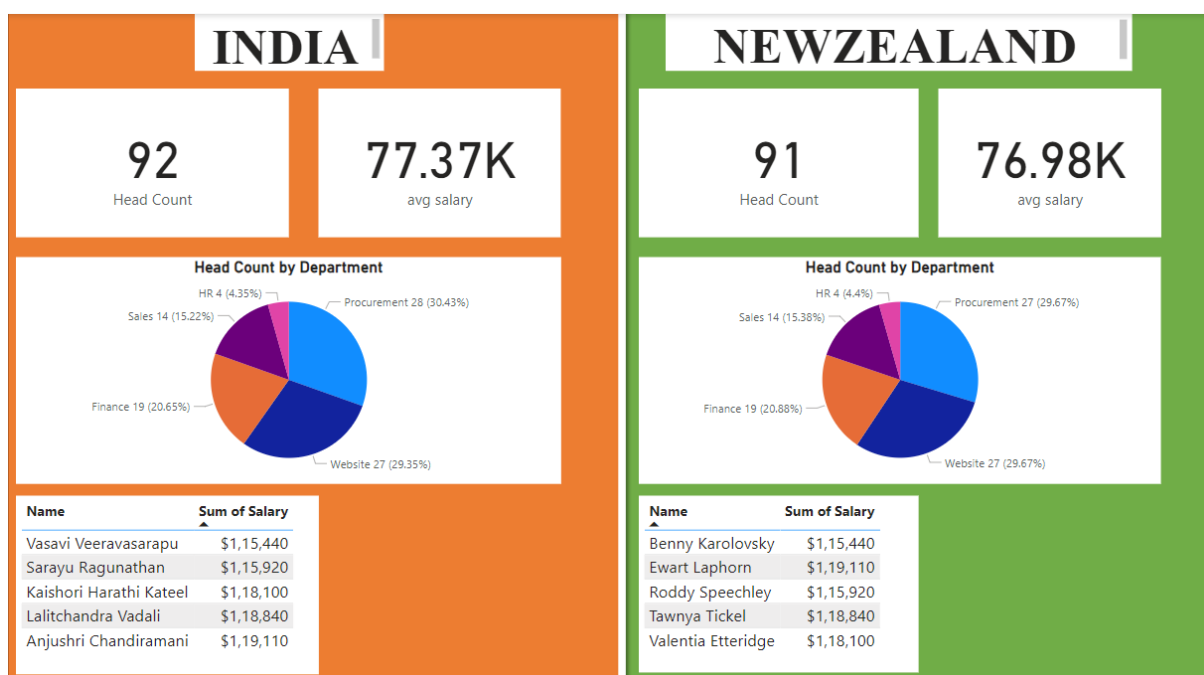
A scatter plot is the best way to explore the relationship between performance and salary. Use PerformanceScore for the X-axis and Salary for the Y-axis, with EmployeeID as the detail.

This visualization provides insights into whether higher performance correlates with higher salaries.



10. India vs. New Zealand – Quick scorecard

To compare India and New Zealand, use a scorecard or table. Filter the data for employees in these two countries. Create metrics such as total employees, average salary, gender ratio, and average performance scores for each country. This scorecard provides a side-by-side comparison of the two regions.



DISCUSSION:

Analysis and Interpretation of Results

Analysis brought forth crucial information on the workforce dynamics of the company. Looking at staff counts by departments, gender, and age groups gave an idea of the trends prevailing, such as resource allocation, diversity levels, and generational composition. The analysis of salary trends threw light on the compensation structure and indicated a gap in salaries across departments and geographies. Performance trends and their linkage with salaries revealed the efficacy of performance-linked rewards. The company growth trend highlighted periods of expansion, and the comparative scorecard between India and New Zealand brought out regional differences in staffing, salaries, and performance. These findings allow for better workforce planning, equitable pay structures, and strategic resource allocation.

Challenges Faced and How They Were Addressed

Several issues had to be overcome to ensure results were accurate. Data quality issues of missing values and outliers were cleansed and helped by the HR team. Very complex relationships like performance versus salary required advanced DAX measures, and visualization has to be given a lot of thought. Consequently, clutter has not occurred within the dashboard itself as thematic pages that break clarity out were found necessary. When such dynamic filters may include seeking by a particular name within employees' databases, or analysis between a pair of countries' related information; data has normalized appropriately for all slicers developed above. Above mentioned solutions for dashboard have assured higher usability reliability making a good analytical product.

COMMUNITY IMPACT:

Encourages Diversity

- Helps the company see where it can improve in hiring people from different backgrounds, genders, and age groups.
- Leads to fairer and more equal opportunities for everyone.

Supports Fair Pay and Rewards

- Makes sure employees are paid fairly based on their work and performance.
- Creates a workplace where hard work and talent are appreciated.

Improves Employee Happiness

- Provides ideas to improve working conditions, pay, and growth opportunities.
- Helps keep employees motivated and loyal to the company.

Helps Local Communities

- Shows how the company's workforce is different in places like India and New Zealand.
- Finds ways to solve local challenges and share ideas to make things better.

Encourages Good Business Practices

- Helps the company make fair and responsible decisions for its employees.
- Inspires other businesses to follow similar ethical practices.

Supports Growth and Stability

- Gives useful insights that help the company grow in the right way.
- Builds a strong reputation as a company that cares for its employees and the community.

CREATIVITY AND INNOVATION:

Data-Driven Insights

Power BI is a creative way to visualize and analyze complex employee data to turn raw data into actionable insights.

It allows for the incorporation of various data points like salary, performance, and size of departments in creating interactive dashboards that will show workforce trends.

Dynamic, Interactive Dashboards

Users can also explore the data in multiple ways by making dynamic dashboards with filters and slicers, making it more interactive and user-friendly.

This allows stakeholders the freedom to drill down further according to what they want to search for, say a department or region.

Performance vs. Salary Analysis

A very innovative approach was taken to explore the relationship between employee performance and salary, using scatter plots and advanced DAX formulas.

This analysis helps in finding out the areas where the pay structure of the company is not aligned with the performance of the employees.

Global Comparisons

With comparisons of workforce data from countries like India and New Zealand, this project presents an innovative method in identifying regional disparities in pay, performance, and

staffing.

Such ability allows the firm to change the strategy in consideration of local condition and global trend.

Employee Search Tool

By allowing the searching of employees starting with a specified letter of name, it gives a novel attribute to ease personnel management and provides accessibility.

It adds an artistic flavor to the dashboard that makes it highly useful for real-time usage in bigger organizations.

User-Centric Design

The use of multiple-page dashboard design is based on focusing on various parameters of the data. It assures the user's experience to be intuitive and aesthetically pleasing at the same time.

Creative use of layout enhances every section of the dashboard that communicates the given information without clogging the screen of the viewer.

CONCLUSION:

This project was able to use Power BI to analyze and visualize key employee data, thus giving the company insights into its workforce. This project helped find out important patterns and trends through the exploration of factors such as staff count, gender distribution, age demographics, salary trends, and performance. Such insights are very important in making informed decisions on hiring, compensation, and employee development.

An interactive dashboard was also built for the project, from which users could easily explore data and get answers to key questions such as what different departments were doing, where top earners came from, and how employee performance relates to salary. The project also provided broader insights into the variation of workforce trends across different countries by comparing regions like India and New Zealand.

In the process of work, there were challenges regarding the quality of data and the necessity of complex visualizations. These difficulties were overcome with data cleaning and much more advanced techniques in Power BI. Creativity and innovation were also evident in the design of an easy-to-use dynamic tool that could penetrate into deeper workforce data insights.

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