

TABLE OF CONTENT:

1. Introduction.....	2
2. Dataset.....	2
3. Data Stories.....	3
4. Managerial Implications and Business Takeaways.....	9
5. Conclusion.....	9
6. References.....	10

1.INTRODUCTION

In the ever-evolving landscape of organizational dynamics, employee attrition stands out as a challenge that demands careful consideration and strategic resolution. The attrition of valuable talent not only disrupts the continuity of operations but also poses a financial burden on the company in terms of recruitment and training. Recognizing the significance of this issue, my motivation for delving into IBM HR Analytics is to decipher the intricate patterns and root causes behind employee attrition.

As I embark on this analytical journey, my aim is to uncover not only the rate of attrition but also the nuanced factors contributing to this phenomenon. The motivation behind this exploration is rooted in the belief that a deep understanding of these factors can empower IBM's human resource professionals and organizational leaders to proactively address and mitigate attrition risks. By focusing on elements such as business travel, work history, monthly income distribution, environment satisfaction, performance metrics, and hike rates, we strive to provide actionable insights that inform targeted strategies for talent retention.

This report is motivated by the desire to transform attrition from a challenge into an opportunity for growth and improvement. Through data-driven analysis, we aspire to equip IBM with the knowledge needed to foster a workplace environment that not only attracts top talent but also nurtures their professional growth and commitment to the organization.

2.DATASET

The dataset was collected by PAVANSUBHASH. It has been uploaded to Kaggle with a usability rating of 9, and the license is Open Data source. The dataset has garnered 1.33 million views and 156K downloads.

<https://www.kaggle.com/datasets/pavansubhasht/ibm-hr-analytics-attrition-dataset>

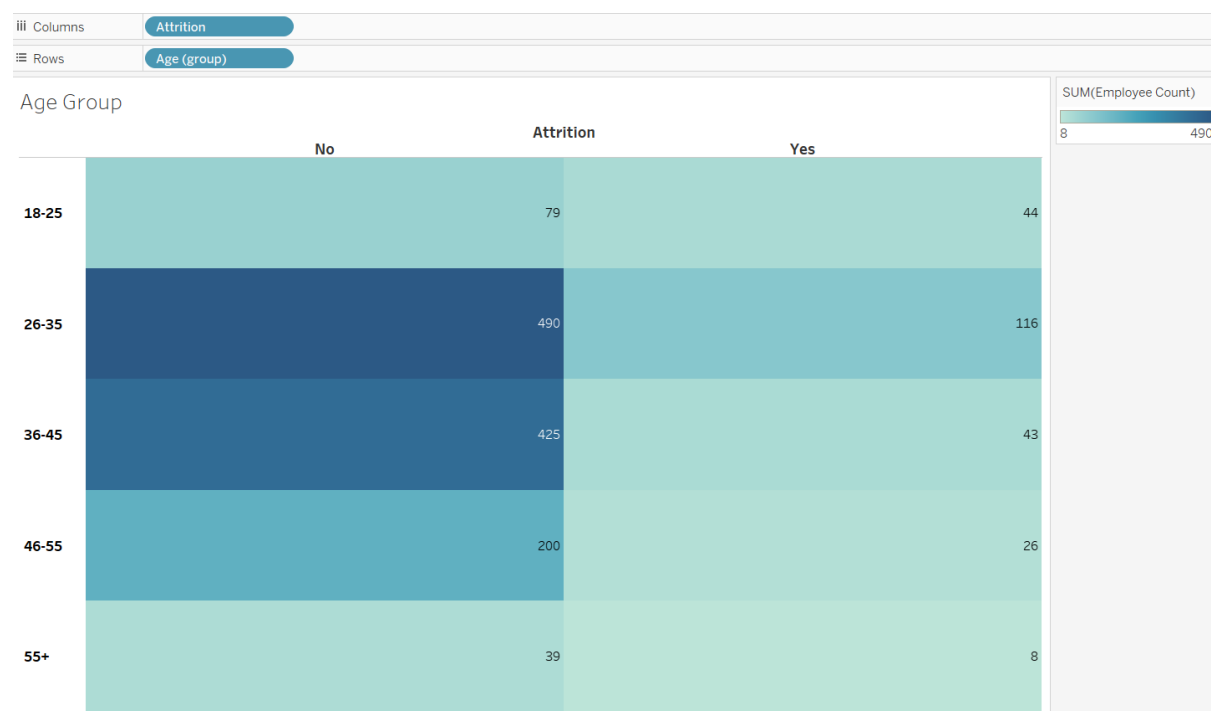
Within the dataset are a total of 1470 records and 35 distinct variables, each one representing various attributes of employees. Each row within the dataset pertains to an individual employee, while each column corresponds to a specific attribute. These variables consist of the following:

- Age: The age of the employee
- Business Travel: Person whether travels rarely, frequently, or non-travel.
- Department: The department within which the employee works
- Distance from Home: The distance between the employee's home and their workplace
- Education: The educational level of the employee, which ranges from 1 (Below College) to 5 (Doctor)
- Education Field: The field of study within the employee's education
- Environment Satisfaction: The degree of satisfaction the employee has with their work environment, which ranges from 1 (Low) to 4 (Very High)
- Job Satisfaction: The level of job satisfaction for the employee, which ranges from 1 (Low) to 4 (Very High)

- Job involvement: The degree of job involvement the employee has with their work , which ranges from 1 (Low) to 4 (Very High)
- Marital Status: The current marital status of the employee
- Monthly Income: The employee's monthly income
- Num Companies Worked: The number of companies the employee worked for before joining IBM
- Performance rating: Evaluation or assessment of an individual's work performance
- Percentage salary hike: Percentage increase in salaries for employees on an annual basis.
- Stock Option Level: Financial incentive offered by companies to employees
- Total working years: Cumulative years of experience held by an employee.
- Work Life Balance: The degree of work-life balance for the employee, ranging from 1 (Bad) to 4 (Best)
- Years At Company: The length of time the employee has worked at IBM

3. DATA STORIES

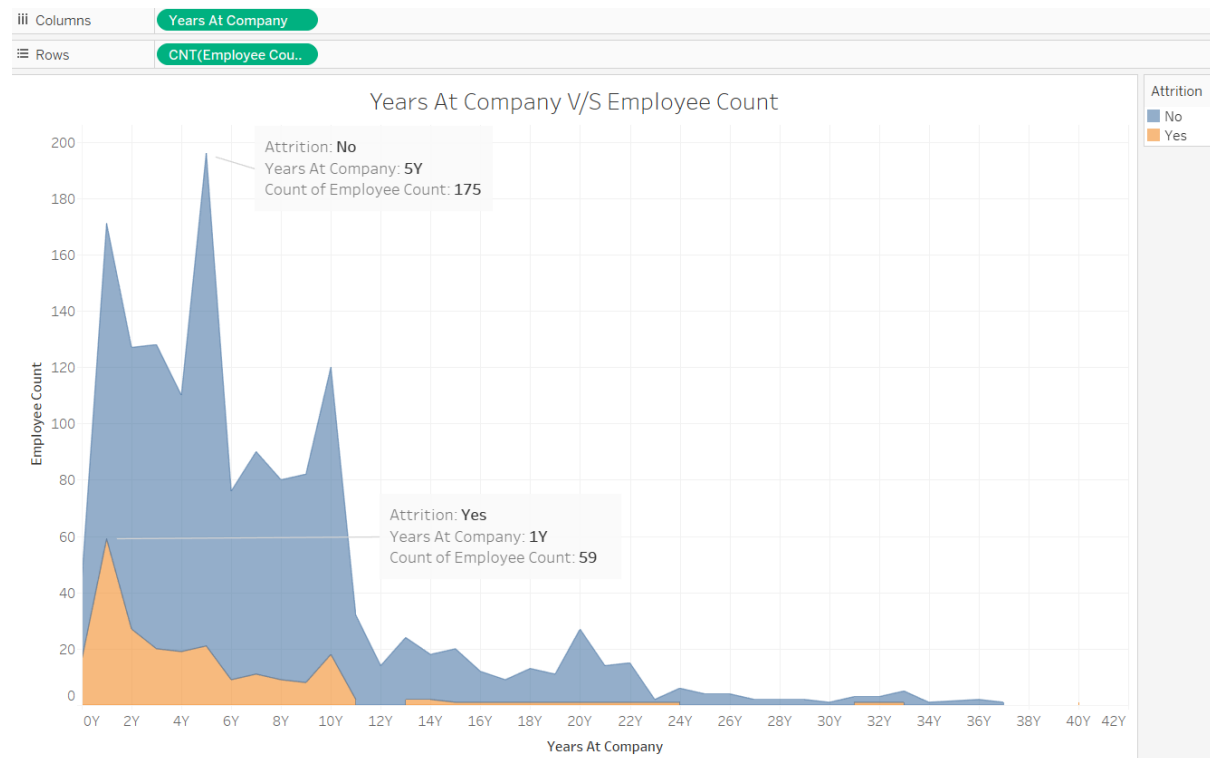
Visualization 1: Heat Map



In examining the attrition landscape across diverse age groups in IBM organization, the visualization highlights the pronounced significance of the 26-35 age group. Representing the largest employee contingent at 490 individuals, this cohort stands out as both the primary source of workforce stability, with the highest count of 490 employees showing no attrition, and concurrently, the group most susceptible to attrition, recording 116 employees with attrition. This dual nature emphasizes the strategic importance of understanding and addressing factors contributing to attrition within this age range. Consequently, my report recommends targeted retention strategies and enhanced engagement initiatives specifically tailored for

employees aged 26-35, aiming to maintain a robust and stable workforce while proactively mitigating attrition risks in this critical demographic segment.

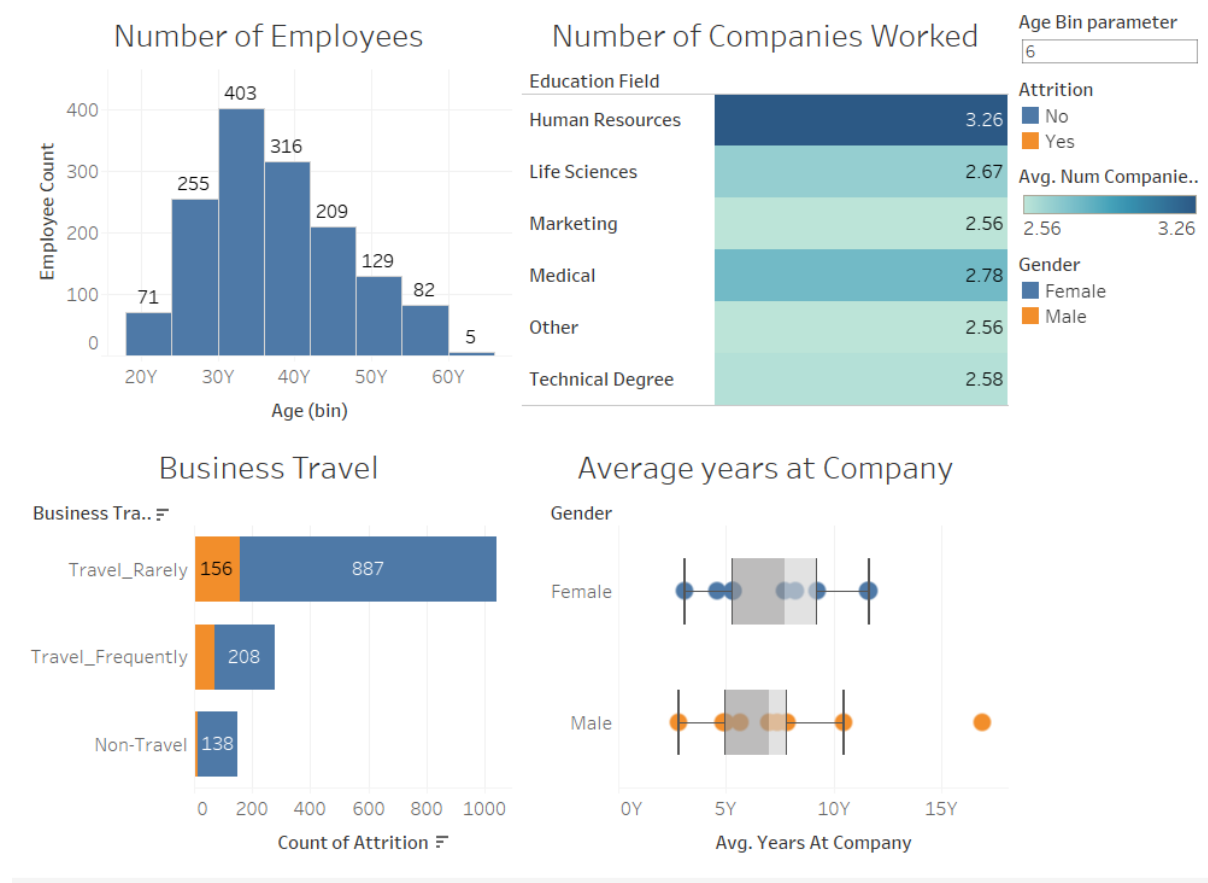
Visualization 2: Area Chart



The area chart effectively visualizes the distribution of employee counts based on the number of years spent at IBM, with attrition status discerned by distinctive colours-blue denoting no attrition and orange indicating attrition. Noteworthy patterns emerge from the data, notably a substantial peak in the number of employees with no attrition at the 5-year mark, totalling 175 individuals. This suggests a cohort of employees achieving a level of stability and commitment after a half-decade of service. Conversely, the chart highlights a maximum attrition count of 59 individuals at the 1-year mark, indicating a potential trend of turnover within the initial year of employment. These observations underscore the importance of implementing targeted onboarding enhancements to reduce attrition during the critical early phase and developing retention strategies to sustain organizational loyalty among those reaching the 5-year milestone. This analysis offers actionable insights for human resources and organizational leaders to strategically address attrition trends and foster a more stable and engaged workforce.

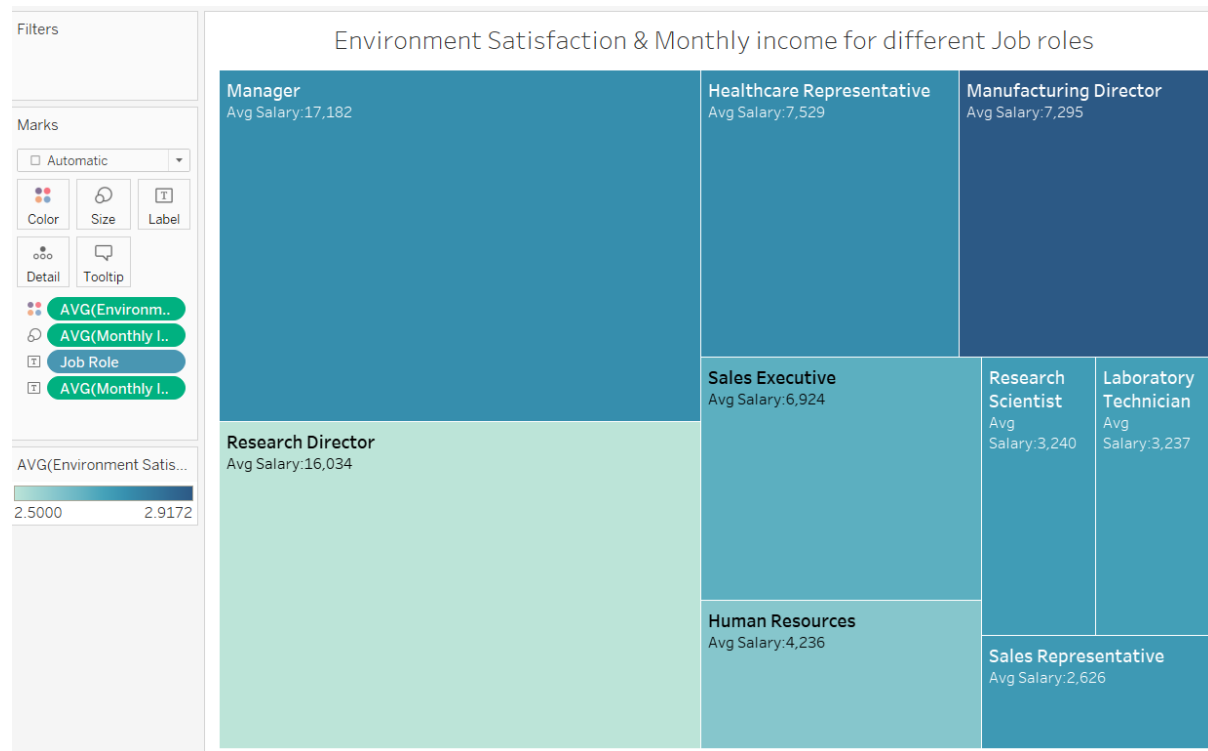
Visualization 3: Dashboard

Dashboard to know the details of employees



The comprehensive dashboard integrates diverse visualizations to offer a holistic perspective on our workforce dynamics. The histogram, with the flexibility to adjust bin sizes based on different years, provides a nuanced exploration of age group distributions. The table detailing the number of companies worked, categorized by educational fields, sheds light on the varied career trajectories within organization. The stacked bar chart depicting attrition counts across different business travel frequencies facilitates quick assessments of travel-related workforce management. Additionally, the box and whisker plot categorizing average years at the company by gender delivers insights into tenure distribution, aiding in gender-specific analyses. A pivotal filter, "Age Group Bin," empowers users to focus on specific age ranges, enhancing the dashboard's interactivity. Together, these visualizations equip decision-makers with a comprehensive understanding of our workforce, enabling the identification of trends, formulation of targeted interventions, and the enhancement of strategic workforce planning.

Visualization 4: Tree map



The tree map visualization offers a compelling comparison between monthly income and environment satisfaction across various job roles in organization. The size of each rectangle provides a clear representation of monthly income, with managers standing out as the role associated with the highest income. Conversely, sales representatives exhibit the lowest monthly income. The incorporation of colour to represent environment satisfaction levels adds depth to the analysis, revealing that research directors report the least satisfaction while manufacturing directors express the highest satisfaction. This dual-dimensional insight enables a nuanced understanding of the relationship between income, job roles, and job satisfaction. The visualization provides strategic guidance by pinpointing areas for potential improvement in compensation and offering insights into practices that contribute to high satisfaction levels, ultimately empowering decision-makers to optimize workforce management strategies.

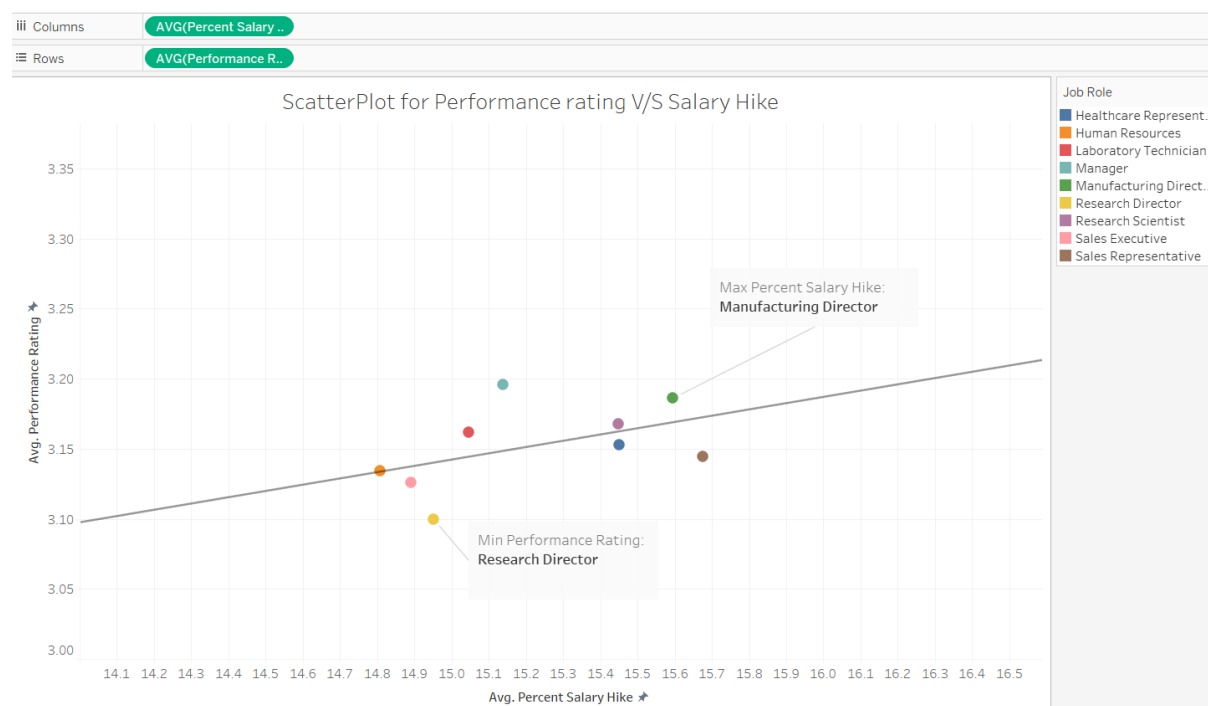
Visualization 5: Table

Job Satisfaction V/S Job Involvement V/S Years since last promotion

Job Role	Avg. Job Satisfaction	Avg. Job Involvement	Avg. Years Since Last Promotion
Healthcare Representative	2.786	2.733	2.969
Research Scientist	2.774	2.798	1.507
Sales Executive	2.755	2.715	2.485
Sales Representative	2.735	2.651	1.060
Manager	2.706	2.775	4.833
Research Director	2.700	2.775	3.188
Laboratory Technician	2.691	2.695	1.421
Manufacturing Director	2.683	2.683	2.117
Human Resources	2.558	2.712	1.269

The provided table offers a concise yet insightful comparison of critical workplace factors, including job satisfaction, job involvement, and years since the last promotion, across various job roles within organization. Healthcare representatives emerge with the highest job satisfaction, indicating a positive and contented work experience within this role. In contrast, research scientists exhibit the highest level of job involvement, suggesting a strong sense of engagement and commitment to their work. The consideration of years since the last promotion adds a temporal dimension to the analysis, providing a basis for understanding career progression patterns. These findings hold strategic significance, guiding decision-makers in tailoring interventions to enhance satisfaction levels for roles that may benefit from improvement and leveraging successful engagement practices observed in roles with high job involvement. This table serves as a valuable tool for human resources and organizational leadership, fostering a nuanced understanding of employee experiences and informing targeted initiatives for workforce optimization.

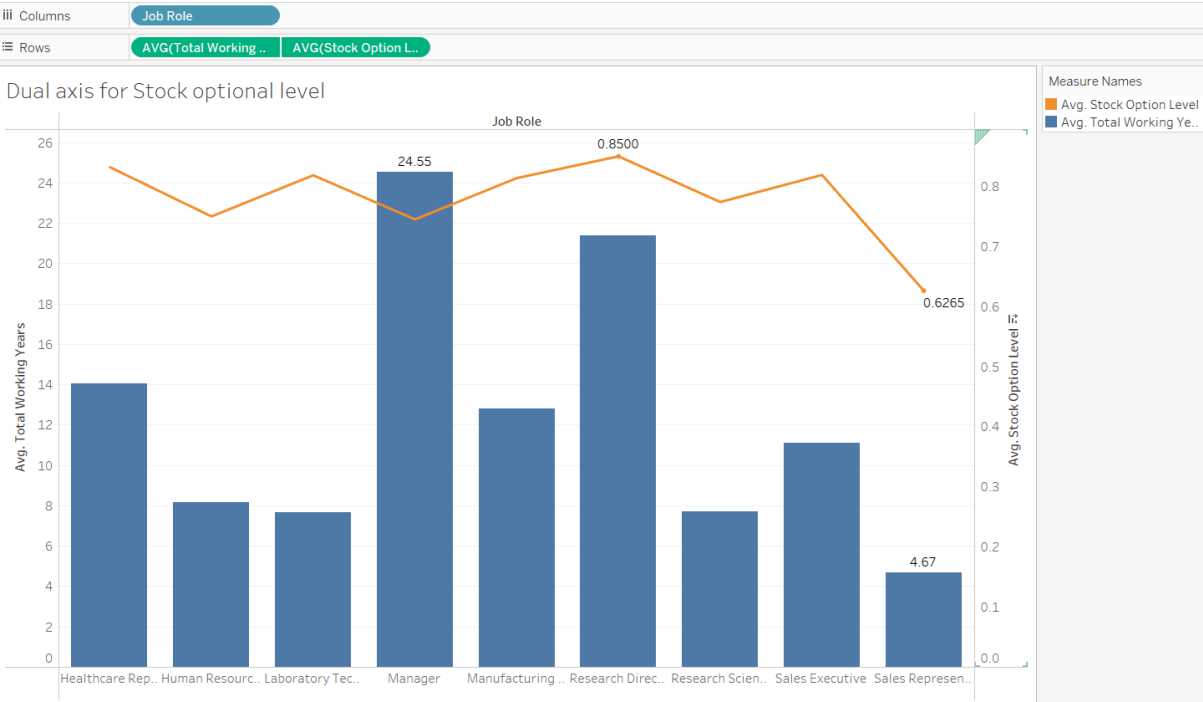
Visualization 6: Scatter Plot



The scatter plot visualization, enriched with a trend line equation linking performance ratings and percentage salary hikes, unveils key dynamics in organization's compensation structure. The equation (performance rating equals 0.044 times percentage salary hike plus 2.47) serves as a valuable quantitative reference, elucidating the relationship between performance assessments and corresponding salary adjustments. Notably, the Manufacturing Director stands out with the highest percentage salary hike, underscoring the significance of this role. Conversely, human resource personnel receive the minimum percentage salary hike, inviting a closer examination of compensation practices in this domain. The observation that managers garner the highest performance ratings emphasizes the alignment between performance excellence and potential salary advancements. On the contrary, research directors receive the

lowest performance ratings, prompting considerations for performance improvement strategies in this role. These findings offer strategic insights for refining compensation policies, ensuring equity, and fostering a performance-driven culture within the organization.

Visualization 7: Dual Axis



The dual-axis visualization seamlessly integrates a bar chart detailing total working years at the company with a line chart illustrating stock option levels across various job roles. Managers emerge as the stalwarts with the highest average total working years, clocking in at 24.55, signalling stability and experience in these leadership positions. Conversely, sales representatives exhibit the lowest average total working years at 4.67, indicative of a relatively younger or recently onboarded workforce in this role. On the stock option front, the chart accentuates the organization's emphasis on incentivizing leadership, with Research Directors boasting the maximum stock option level. In contrast, sales representatives have the least stock option levels, aligning with the typical practice of offering fewer stock options to entry-level or non-executive positions. These insights offer strategic considerations for talent retention, succession planning, and aligning stock-based incentives with organizational objectives, providing a robust foundation for informed decision-making in talent management and compensation strategies.

4. MANAGERIAL IMPLICATIONS AND BUSINESS TAKEAWAYS

The analytical journey through IBM HR Analytics uncovers crucial managerial implications, providing actionable insights for organizational leaders. Firstly, recognizing the pivotal role of the 26-35 age group in both stability and susceptibility to attrition, targeted retention strategies should be crafted to ensure a robust and engaged workforce. Implementing enhanced engagement initiatives specifically tailored for this demographic segment can significantly mitigate attrition risks.

Secondly, the analysis of years spent at IBM highlights the need for differentiated approaches at critical milestones. Early interventions, such as improved onboarding experiences, can reduce attrition within the first year, while sustained efforts to maintain organizational loyalty are crucial for employees reaching the 5-year mark. These findings underscore the importance of a strategic approach to employee lifecycle management.

The comprehensive dashboard, offering a 360-degree view of workforce dynamics, equips decision-makers with the tools to identify trends and formulate targeted interventions. Proactive workforce planning, informed by these insights, can enhance organizational stability and performance.

Additionally, the detailed examination of job roles, compensation structures, and performance dynamics presents an opportunity for refining managerial practices. Tailoring compensation policies to align with performance ratings and ensuring equity across roles can foster a more motivated and committed workforce. Furthermore, recognizing the influence of job satisfaction and involvement, leaders can implement initiatives to enhance the employee experience, ultimately contributing to higher retention rates.

In essence, the business takeaways from this analysis call for a strategic and proactive approach to talent management. By tailoring interventions to specific age groups, career milestones, and job roles, organizational leaders can foster a workplace environment that not only attracts top talent but also retains and nurtures the professional growth of existing employees. Continuous monitoring and adaptation of these strategies will be essential to address evolving workforce dynamics and sustain a thriving, engaged, and committed workforce at IBM.

5. CONCLUSION

In conclusion, this exploratory journey into IBM HR Analytics has not only unraveled the intricate patterns of employee attrition but has also illuminated a strategic path forward for organizational leaders. The nuanced insights derived from age group dynamics, critical milestones, job roles, and compensation structures offer actionable takeaways with profound managerial implications. Recognizing the strategic significance of the 26-35 age group, targeted retention strategies are paramount, accompanied by a tailored approach to onboarding and sustained efforts to enhance organizational loyalty. The comprehensive dashboard, an amalgamation of insightful visualizations, serves as a powerful tool for decision-makers, guiding interventions that optimize stability, engagement, and performance across the workforce. Beyond demographics, the analysis propels managerial practices towards aligning compensation policies with performance ratings and prioritizing initiatives to enhance the employee experience. As a result, this project positions IBM not merely to address attrition

challenges but to harness them as opportunities for growth and improvement. With a commitment to continuous monitoring and strategic adaptations, IBM stands poised to cultivate a workplace environment that attracts, retains, and fosters the professional growth of its employees, ensuring enduring success amidst the ever-evolving organizational landscape.

6. REFERENCES

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