HR Analysis Demonstration

In today’s competitive business environment, organizations are increasingly relying on the HR department to gain deeper insights into workforce dynamics and drive strategic decisions.

However, the understanding of key employee-related metrics such as attrition, performance, and compensation remains limited, even though they are vital for optimizing human capital and improving organizational outcomes. Therefore, it is essential to leverage insights through the development of a targeted set of Key Performance Indicators (KPIs) to effectively address specific HR challenges.

My analysis is logically structured through the use of Excel, SQL, and Power BI, following a systematic approach of Data Analysis.

1. Identify the requirements from the stakeholders

First we identify the requirements from the HR department, then provide solutions to help them resolve the questions.

1.1. The problem statements from the HR department

Overall view

There is a need for a comprehensive understanding of employee-related metrics and trends to inform HR decisions and optimize workforce management.

Attrition and employee retention

High employee turnover remains a challenge, and the factors driving attrition are not fully understood. Identifying key drivers of attrition and implementing targeted retention strategies is essential for reducing turnover and improving workforce stability.

Employee performance and compensation

Misalignment between compensation and performance may lead to decreased motivation, reduced productivity, and difficulty retaining top talent.

Career development and promotion opportunities

Limited career development pathways and promotion opportunities within the organization may contribute to employee dissatisfaction and higher attrition rates. Understanding how career progression influences employee retention and satisfaction is crucial for developing effective talent management strategies.

1.2. Specific questions for problem resolve

Overall view

- How does the number of employees in high-paying roles compare to those in low-paying roles?
- What is the average salary distribution by job level?
- What is the average salary distribution by job role?

Attrition and employee retention

- Overall Attrition rate
- Attrition rate by age group
- Attrition rate by gender
- Attrition rate by department
- Average attrition rate by job level
- Ranking employees by attrition risk using multiple factors
- Attrition by distance from home and satisfaction

Employee performance and compensation

- Who are the top performers, and are they being fairly compensated?
- Which employees are at risk of leaving due to compensation, satisfaction issues?
- Compensation disparities by department and job role
- Top 10 highest-performing but underpaid employees

Career Development and Promotion Opportunities

- Understand how career progression varies across departments and job roles.
- Time to promotion analysis by gender and job role
- Identify different employee segments based on development needs and career aspirations.

2. Prepare

In this phase, we will identify and assess the features of our dataset.

The dataset is publicly available in https://www.kaggle.com/datasets/pavansubhasht/ibm-hr-analytics-attrition-dataset

It comes with 1470 rows and 35 columns, each observation is information about an employee.

Column	Description	Column	Description
Age	The employee's age.	MonthlyIncome	The employee’s monthly salary.
Attrition	Indicates whether the employee left the company ("Yes") or remains employed ("No").	MonthlyRate	Another financial variable, indicating the monthly salary rate.
BusinessTravel	Describes the frequency of the employee’s business travel.	NumCompaniesWorked	The number of companies the employee has previously worked for.
DailyRate	The employee's daily salary rate.	Over18	Indicates whether the employee is over the age of 18.
Department	The department in which the employee works.	OverTime	Indicates whether the employee regularly works overtime.
DistanceFromHome	The distance between the employee's home and the workplace.	PercentSalaryHike	The percentage increase in the employee’s salary.

Column	Description	Column	Description
Education	Employee’s level of education (on a scale of 1 to 5).	PerformanceRating	The employee’s performance rating (1-4).
EducationField	The field in which the employee received their education.	RelationshipSatisfaction	Satisfaction with workplace relationships (rated 1-4).
EmployeeCount	Constant field with a value of "1" for all employees.	StandardHours	The standard number of working hours (always 40).
EmployeeNumber	A unique identifier assigned to each employee.	StockOptionLevel	The level of stock options given to the employee (0-3).
EnvironmentSatisfaction	Employee satisfaction with their work environment (rated 1-4).	TotalWorkingYears	The total number of years the employee has worked.
Gender	The employee’s gender.	TrainingTimesLastYear	The number of training sessions attended by the employee in the last year.
HourlyRate	The employee’s hourly wage.	WorkLifeBalance	Employee’s work-life balance rating (1-4).
JobInvolvement	The degree of the employee’s involvement in their job (rated 1-4).	YearsAtCompany	The number of years the employee has been with the current company.
JobLevel	The employee's job level, from entry-level (1) to senior positions (5).	YearsInCurrentRole	The number of years the employee has been in their current role.
JobRole	The specific role the employee holds within the organization.	YearsSinceLastPromotion	The number of years since the employee's last promotion.
JobSatisfaction	Employee's satisfaction with their job (rated 1-4).	YearsWithCurrManager	The number of years the employee has worked with their current manager.
MaritalStatus	The marital status of the employee.		

3. Process

While exploring the dataset, I noticed the following;

- The data looks correct and consistent. Everything looks well structured for further analysis, just needs a little editing.
- To check for missing data, I hit filters and filtered rows for blanks and can confirm that the dataset contains no missing values.
- With the help of the “Remove duplicates” in Excel, I noticed all the rows had some variety to it hence returning no duplicate data for our data set.
- Lastly, I made sure to format all the columns that need to be numeric data

Now our dataset is ideal for analysis to discover relationships, trends and patterns that will give us a competitive edge and completely solve our business objectives.

4. Analyze

Once the data is successfully imported, I will conduct an exploratory data analysis on the HR dataset. A series of tasks will be addressed, each followed by the corresponding query input and output. Upon completing the analysis, we will transition to creating a dashboard that highlights the key insights and components necessary to address the business problem at hand.

💡 Note: Some parts of the queries may be missing due to the file export process. For the complete queries, please visit the following GitHub link: https://github.com/ducduycuf/SQL_HR-Employee-Analytics

4.1. Overall view

4.1.1. How does the number of employees in high-paying roles compare to those in low-paying roles?

```
with SalaryCategory as
    (
    select
        case
            when MonthlyIncome < (select AVG(MonthlyIncome) from Attrition) then 'low'
            when MonthlyIncome >= (select AVG(MonthlyIncome) from Attrition) then 'high'
        end as SalaryCategory
    from Attrition
),
EmployeeCount as
    (
    select
        SalaryCategory,
        count(*) as EmployeeCount
    from SalaryCategory
    group by SalaryCategory
)
select
    SalaryCategory,
    EmployeeCount,
    CAST((EmployeeCount * 100.0 / (select count(*) from Attrition)) as decimal(8,2)) as Percenta
from EmployeeCount
order by SalaryCategory
```

SalaryCategory	EmployeeCount	Percentage
high	494	33.61
low	976	66.39

The “High salary category” refers to people with monthly income larger than average, and the “Low salary category” being the opposite. As we can see, nearly two-thirds of the workforce earn less than average, while approximately one-third earn more than average.

For the most general view, we can strongly see the presence of some level of income disparity. However, we need to further look into other statistical aspects to be 100% sure about this assumption. For instance, if the difference between the lowest and highest earners is not substantial, the actual income inequality might be minimal.

Let’s look more at the salary distribution.

4.1.2. What is the average salary distribution by job level?

```
with AvgSalary as
    (
    select
        JobLevel,
        AVG(MonthlyIncome) as AvgSalary,
        count (*) as EmployeeCount
    from Attrition
    group by JobLevel
)
```

```
select
    *,
    CAST((EmployeeCount * 100.0 / (select count(*) from Attrition)) as decimal(8,2)) as Percenta
from AvgSalary
order by JobLevel
```

JobLevel	AvgSalary	EmployeeCount	Percentage
1	2786	543	36.94
2	5502	534	36.33
3	9817	218	14.83
4	15503	106	7.21
5	19191	69	4.69

The "Percentage" column represents the proportion of employees at each job level relative to the total workforce. This allows us to see how employees are distributed across different job levels within the organization.

As job levels increase, so does the average salary, indicating a structured salary progression. This suggests that the organization has a clear framework for rewarding higher job levels with corresponding salary increments.

The significant salary gaps between job levels point to substantial pay increases as employees move up, serving as a strong motivator for the workforce to strive for promotions.

Most employees are concentrated in job levels 1 and 2, where the average salary is also the lowest. This is likely because the organization hires a larger number of employees for entry-level positions, which are typically associated with lower pay.

4.1.3. What is the average salary distribution by job role?

```
with AvgSalary as
    (
    select
        JobRole,
        AVG(MonthlyIncome) as AvgSalary,
        count (*) as EmployeeCount
    from Attrition
    group by JobRole
)
select
    *,
    CAST((EmployeeCount * 100.0 / (select count(*) from Attrition)) as decimal(8,2)) as Percenta
from AvgSalary
order by Percentage desc
```

JobRole	AvgSalary	EmployeeCount	Percentage
Sales Executive	6924	326	22.18
Research Scientist	3239	292	19.86
Laboratory Technician	3237	259	17.62
Manufacturing Director	7295	145	9.86
Healthcare Representative	7528	131	8.91
Manager	17181	102	6.94
Sales Representative	2626	83	5.65
Research Director	16033	80	5.44
Human Resources	4235	52	3.54

Sales and Research roles form a substantial part of the workforce, highlighting their critical role in the organization's operations.

In contrast, Management positions, particularly for roles like Manager and Research Director, have fewer employees. This could signal a potential gap in leadership development or the need for more structured succession planning in these areas.

The higher average salaries for managerial and director roles align with their strategic importance and greater influence within the organization.

Sales executives, despite making up a large portion of the workforce, earn relatively higher salaries. This reflects the organization's emphasis on the value of sales in driving revenue and growth. The productivity of these roles is likely tied to performance-based bonuses, such as key performance indicators (KPIs), further justifying their higher compensation.

Now, let's shift focus to analyzing employee attrition.

4.2. Employee Attrition

4.2.1. Overall attrition rate

```
select
    CAST(COUNT(case when Attrition = 'Yes' then 1 else null end) * 100.0  / COUNT(*) as decimal(
        as Attrition_Rate
from Attrition
```

The overall attrition rate of the employee is **16.12%**. While **16.12%** might not be alarmingly high, it is important to consider the broader context and take steps to improve retention if necessary.

4.2.2. Attrition rate by age group

```
select
    Age,
    CAST(COUNT(case when Attrition = 'Yes' then 1 else null end) * 100.0  / COUNT(*) as decimal(
        as Attrition_Rate
from Attrition
group by Age
order by Age
```

Age	Attrition_Rate	Age	Attrition_Rate
19	66.67	55	13.64
20	54.55	35	12.82
18	50	47	12.5
21	46.15	46	12.12
58	35.71	37	12
22	31.25	34	11.69
26	30.77	51	10.53
28	29.17	53	10.53
23	28.57	48	10.53
24	26.92	40	8.77
29	26.47	36	8.7
31	26.09	49	8.33
25	23.08	27	6.25
56	21.43	43	6.25
33	20.69	45	4.88
44	18.18	42	4.35
32	18.03	38	3.45
50	16.67	59	0
52	16.67	60	0
30	15	54	0
41	15	57	0
39	14.29		

The highest attrition rates are found among younger employees, especially those aged 18-25. This could be attributed to the nature of early career transitions, as many factors influence Gen Z's tendency to switch jobs more frequently.

In contrast, attrition rates decrease significantly between the ages of 35-44, suggesting that employees in this age group experience a period of stability and stronger commitment to the organization.

However, attrition tends to rise again among employees aged 55 and above, likely due to factors such as retirement planning, health considerations, or a shift in lifestyle preferences.

4.2.3. Attrition rate by gender

```
select
    Gender,
    CAST(COUNT(case when Attrition = 'Yes' and YearsAtCompany > 2 then 1 else null end) * 100.0
                        / COUNT(*)
                        as decimal(8,2))
        as Attrition_Rate
from Attrition
group by Gender
order by Attrition_Rate desc
```

Gender	Attrition_Rate
Male	9.41
Female	8.84

The difference in attrition rate between two genders is relatively small, indicating that the reason for attrition is not related to gender inequality.

4.2.4. Attrition rate by department

```
select
    Department,
    CAST(COUNT(case when Attrition = 'Yes' and YearsAtCompany > 2 then 1 else null end) * 100.0
                        / COUNT(*)
                        as decimal(8,2))
                as Attrition_Rate
from Attrition
group by Department
order by Attrition_Rate desc
```

Department	Attrition_Rate
Sales	12.56
Human Resources	9.52
Research & Development	7.60

The Sales department has the highest attrition rate, while the R&D department experiences the lowest. This disparity may stem from the nature of career development in sales, where executives often feel limited in growth if they remain at the same organization for an extended period. As a result, many sales professionals seek better opportunities or compensation by moving between companies or industries, especially given the high-pressure environment.

In contrast, R&D projects tend to be long-term and stable, providing employees with a sense of security and continuity, which likely encourages longer tenures.

Additionally, differences in compensation and benefits between departments further illustrate this trend. For example, the Research Director's salary ranks among the highest in the organization, just below the Manager role. This suggests that R&D employees are more inclined to stay for a longer period in pursuit of promotions and career growth.

4.2.5. Average attrition rate by job level

```
select
    JobLevel,
    CAST(COUNT(case when Attrition = 'Yes' and YearsAtCompany > 2 then 1 else null end) * 100.0
                        / COUNT(*)
                        as decimal(8,2))
            as Attrition_Rate
from Attrition
```

```
group by JobLevel
order by Attrition_Rate desc
```

JobLevel	Attrition_Rate
3	11.93
1	11.79
5	7.25
2	6.74
4	3.77

The highest attrition rate is seen at job level 3, which could be due to the specific responsibilities and challenges that may involve higher stress or more demanding tasks, leading to increased turnover.

Job level 1 follows with the second highest attrition rate, potentially driven by new employees feeling overwhelmed as they adjust to the organization.

Meanwhile, job levels 2 and 4 have relatively low attrition rates, possibly because these levels offer clear career progression or advancement opportunities, encouraging employees to stay with the organization.

4.2.6. Ranking employees by attrition risk using multiple factors

```
with Attrition_Rank as
    (
    select
        EmployeeNumber,
        JobRole,
        OverTime,
        JobSatisfaction,
        WorkLifeBalance,
        DENSE_RANK() over(order by
            case
                when OverTime = 'Yes' then 1 else null
            end desc,
            JobSatisfaction,
            WorkLifeBalance) as Attrition_Rank
    from Attrition
)
select *
from Attrition_Rank
where OverTime = 'Yes'
order by Attrition_Rank
```

EmployeeNumber	JobRole	OverTime	JobSatisfaction	WorkLifeBalance	Attrition_Rank
932	Laboratory Technician	Yes	1	1	1
1649	Laboratory Technician	Yes	1	1	1
1674	Laboratory Technician	Yes	1	2	2
1758	Sales Executive	Yes	1	2	2
1968	Sales Executive	Yes	1	2	2
1998	Research Scientist	Yes	1	2	2
1015	Research Director	Yes	1	2	2
1167	Sales Executive	Yes	1	2	2
1244	Research Scientist	Yes	1	2	2
1251	Healthcare Representative	Yes	1	2	2
1360	Manufacturing Director	Yes	1	2	2
1494	Laboratory Technician	Yes	1	2	2
10	Laboratory Technician	Yes	1	2	2
68	Sales Executive	Yes	1	2	2
124	Healthcare Representative	Yes	1	2	2
267	Research Scientist	Yes	1	2	2
454	Laboratory Technician	Yes	1	2	2
605	Manufacturing Director	Yes	1	2	2
802	Research Scientist	Yes	1	2	2

Here is an example of the top 2 employees ranked by their likelihood of attrition (the whole table contains hundreds of observations

To identify the employees most likely to leave, I filtered the dataset by three key factors that are unrelated to expertise issues: "OverTime," "JobSatisfaction," and "WorkLifeBalance." Based on these criteria, I ranked the employees who have the highest potential to leave the organization.

4.2.7. Attrition by distance from home and satisfaction

```
with Attrition_cal as
    (
    select
        DistanceFromHome,
        JobSatisfaction,
        COUNT(*) as Count_Employee,
        COUNT(case when Attrition = 'Yes' then 1 else null end) as AttritionCount,
        STRING_AGG(EmployeeNumber, ', ') as EmployeeNumbers
    from Attrition
    group by DistanceFromHome, JobSatisfaction
    )
select
    DistanceFromHome,
    JobSatisfaction,
    Count_Employee,
    AttritionCount,
    CAST((AttritionCount * 100.0 / Count_Employee) as decimal(8,2)) as AttritionRate,
    EmployeeNumbers
from Attrition_cal
order by AttritionRate desc
```

DistanceFromHome	JobSatisfaction	Count_Employee	AttritionCount	AttritionRate	EmployeeNumbers
17	4	1	1	100.00	1960
27	4	3	2	66.67	283, 747, 1797
20	2	3	2	66.67	1475, 248, 1818
21	2	3	2	66.67	1821, 1698, 959
22	3	8	5	62.50	1665, 1714, 1004, 1389, 167, 577, 492, 669
13	1	5	3	60.00	650, 250, 1844, 1803, 1733
23	1	5	3	60.00	590, 75, 1002, 1165, 1310
24	1	5	3	60.00	1252, 1082, 605, 1968, 1928
16	1	9	5	55.56	1905, 1758, 1674, 1436, 819, 1042, 412, 732, 33
29	1	4	2	50.00	282, 1211, 1037, 1725
12	1	4	2	50.00	1829, 1167, 837, 648
24	2	6	3	50.00	1489, 1604, 986, 1049, 1173, 419
25	2	8	4	50.00	421, 565, 1108, 899, 881, 1545, 1306, 1318
13	3	4	2	50.00	645, 1372, 1933, 1951
14	4	4	2	50.00	1421, 924, 325, 500
9	1	19	9	47.37	239, 200, 27, 190, 758, 1193, 1157, 864, 991, 913, 1548, 1534, 1439, 1494, 1772, 1680, 1807, 1936, 2023
24	3	5	2	40.00	1005, 392, 11, 19, 744
15	3	8	3	37.50	15, 582, 1160, 1102, 1052, 1837, 1628, 1666
17	3	9	3	33.33	608, 1405, 1206, 992, 1088, 1009, 1013, 1767, 1718
21	3	3	1	33.33	270, 1107, 1929
24	4	12	4	33.33	2056, 2014, 1868, 1907, 1689, 1736, 335, 223, 632, 622, 772, 1273
6	1	12	4	33.33	2062, 1911, 1594, 932, 957, 811, 532, 474, 630, 101, 133, 31
26	1	6	2	33.33	299, 684, 1066, 1242, 1387, 1612
12	3	3	1	33.33	1614, 533, 58
29	2	6	2	33.33	2010, 355, 376, 1568, 1514, 836
14	2	6	2	33.33	1582, 1010, 161, 252, 254, 1934

Long commutes and low job satisfaction can significantly impact employee attrition. To analyze this, I calculated the total number of employees for each unique combination of "DistanceFromHome" and "JobSatisfaction." The "AttritionCount" column indicates how many employees left the company within each group. To find the attrition rate for each combination, I divided the "AttritionCount" by the total number of employees in that specific group.

The results indicate that the issues of long commutes and low job satisfaction are not the primary reasons driving employee attrition.

4.3. Employee Performance and Compensation

4.3.1. Who are the top performers, and are they being fairly compensated?

```
with RankedCompensation as (
    select
        EmployeeNumber, JobRole, MonthlyIncome, PerformanceRating,
        DENSE_RANK()
```

```
                over (partition by JobRole order by PerformanceRating desc, MonthlyIncome desc)
         AS PerformanceRank
    from
       Attrition
)
select
    EmployeeNumber, JobRole, MonthlyIncome, PerformanceRating, PerformanceRank
from
    RankedCompensation
where
    PerformanceRank <= 5;
```

EmployeeNumber	JobRole	MonthlyIncome	PerformanceRating	PerformanceRank
119	Healthcare Representative	13503	4	1
499	Healthcare Representative	10965	4	2
343	Healthcare Representative	10938	4	3
1397	Healthcare Representative	10920	4	4
1697	Healthcare Representative	10883	4	5
1744	Human Resources	9756	4	1
103	Human Resources	5021	4	2
1890	Human Resources	3886	4	3
177	Human Resources	2942	4	4
878	Human Resources	2342	4	5
147	Laboratory Technician	6074	4	1
76	Laboratory Technician	5915	4	2
1509	Laboratory Technician	4789	4	3
1177	Laboratory Technician	4420	4	4
1420	Laboratory Technician	4284	4	5
1282	Manager	19847	4	1
1595	Manager	19613	4	2
1578	Manager	19586	4	3
140	Manager	18844	4	4
1306	Manager	18061	4	5
867	Manufacturing Director	13826	4	1
2034	Manufacturing Director	13570	4	2
1775	Manufacturing Director	12965	4	3
880	Manufacturing Director	10685	4	4
581	Manufacturing Director	10648	4	5
1035	Research Director	19973	4	1
1423	Research Director	19701	4	2
1666	Research Director	17603	4	3
997	Research Director	17399	4	4
843	Research Director	17159	4	5
1847	Research Scientist	6962	4	1
2	Research Scientist	5130	4	2
1956	Research Scientist	5003	4	3
1483	Research Scientist	4900	4	4
1080	Research Scientist	4615	4	5
729	Sales Executive	10475	4	1
244	Sales Executive	10453	4	2
1950	Sales Executive	9888	4	3
1100	Sales Executive	9582	4	4
74	Sales Executive	9069	4	5
1835	Sales Representative	5405	4	1
1864	Sales Representative	3540	4	2
27	Sales Representative	3407	4	3
248	Sales Representative	3140	4	4
1556	Sales Representative	2644	4	5

Need to see further what reasons lead to the discrepancies in monthly incomes between these employees, though the performance ratings are equals.

4.3.2. Which employees are at risk of leaving due to compensation, satisfaction issues?

```
with RiskRank as
    (
```

```
    select
        EmployeeNumber,
        PerformanceRating,
        MonthlyIncome,
        JobSatisfaction,
        DENSE_RANK() over(order by JobSatisfaction asc, MonthlyIncome asc) as RiskRank
    from Attrition
    where Attrition = 'No'
)
select *
from RiskRank
where RiskRank <= 10
order by RiskRank
```

EmployeeNumber	PerformanceRating	MonthlyIncome	JobSatisfaction	RiskRank
1883	3	2062	1	1
1441	4	2066	1	2
1301	3	2080	1	3
1434	3	2099	1	4
1762	3	2109	1	5
362	3	2176	1	6
88	3	2194	1	7
530	3	2218	1	8
1244	3	2235	1	9
200	4	2238	1	10

The result shows the top 10 employees with the lowest monthly income and job satisfaction.

→ analyze the root causes behind these employees' low income and job satisfaction

→ are they worth retention?

4.3.3. Compensation Disparities by Department and Job Role

```
with RoleAvgIncome as
    (
    select
        Department,
        JobRole,
        AVG(MonthlyIncome) as RoleAvgIncome
    from Attrition
    group by Department, JobRole
),
DeptAvgIncome as
    (
    select
        Department,
        AVG(MonthlyIncome) as DeptAvgIncome
    from Attrition
    group by Department
)
select
    ri.Department,
    JobRole,
    RoleAvgIncome,
    DeptAvgIncome,
    (RoleAvgIncome - DeptAvgIncome) as IncomeDiff
from DeptAvgIncome di
```

```
join RoleAvgIncome ri on ri.Department = di.Department
order by Department
```

Department	JobRole	RoleAvgIncome	DeptAvgIncome	IncomeDiff
Human Resources	Human Resources	4235	6654	-2419
Human Resources	Manager	18088	6654	11434
Research & Development	Healthcare Representative	7528	6281	1247
Research & Development	Laboratory Technician	3237	6281	-3044
Research & Development	Manager	17130	6281	10849
Research & Development	Manufacturing Director	7295	6281	1014
Research & Development	Research Director	16033	6281	9752
Research & Development	Research Scientist	3239	6281	-3042
Sales	Manager	16986	6959	10027
Sales	Sales Executive	6924	6959	-35
Sales	Sales Representative	2626	6959	-4333

This analysis helps determine whether certain job roles are compensated above or below the departmental average, highlighting potential pay equity issues or differences in role-specific value.

There are significant discrepancies in compensation for Manager and Director roles across all departments, which is understandable since these positions are typically viewed as more valuable, warranting higher salaries. Aside from these roles, it appears that there are no notable pay inequities within other job roles.

4.3.4. Top 10 highest-performing but underpaid employees

```
with AvgIncomeforPerformance as
    (
    select
        Department,
        EmployeeNumber,
        PerformanceRating,
        MonthlyIncome,
        AVG(MonthlyIncome) over(partition by PerformanceRating) as AvgIncomePerPerformance
    from Attrition
)
select
    top 10 Department,
    EmployeeNumber,
    PerformanceRating,
    MonthlyIncome,
    AvgIncomePerPerformance
from AvgIncomeforPerformance
where MonthlyIncome < AvgIncomePerPerformance
order by PerformanceRating desc, MonthlyIncome
```

Department	EmployeeNumber	PerformanceRating	MonthlyIncome	AvgIncomePerPerformance
Sales	1056	4	1052	6313
Research & Development	243	4	1102	6313
Research & Development	1270	4	1223	6313
Research & Development	811	4	1601	6313
Research & Development	556	4	1702	6313
Research & Development	1248	4	1859	6313
Research & Development	1374	4	2029	6313
Research & Development	1581	4	2061	6313
Human Resources	1499	4	2064	6313
Research & Development	1441	4	2066	6313

The idea occurred to me to examine the top 10 employees with the highest performance rating but earn less than the average within their performance rating.

The employee with the lowest income in return for his outstanding working results, has almost one-sixth of the average income. Here is some of my perspective for this scenario:

- While performance ratings are intended to be objective measures, they can be influenced by factors such as personal biases, workload distribution, or even the relationship between the employee and their manager.
- The company may prioritize factors other than performance when determining compensation, such as tenure, educational background, or specific skills.

Regardless, this is a problem that the HR department needs to work on and bring decisions about whether these employees are well-rewarded.

4.4. Career Development and Promotion Opportunities

4.4.1. Understand how career progression varies across departments and job roles.

```
select
    Department,
    JobRole,
    AVG(YearsAtCompany) as AvgYearsAtCompany,
    AVG(YearsInCurrentRole) AS AvgYearsInCurrentRole,
    AVG(YearsSinceLastPromotion) AS AvgYearsSinceLastPromotion
from Attrition
group by Department, JobRole
order by Department, JobRole
```

Department	JobRole	AvgYearsAtCompany	AvgYearsInCurrentRole	AvgYearsSinceLastPromotion
Human Resources	Human Resources	5	3	1
Human Resources	Manager	16	5	4
Research & Development	Healthcare Representative	8	4	2
Research & Development	Laboratory Technician	5	3	1
Research & Development	Manager	13	6	5
Research & Development	Manufacturing Director	7	4	2
Research & Development	Research Director	10	6	3
Research & Development	Research Scientist	5	3	1
Sales	Manager	15	6	4
Sales	Sales Executive	7	4	2
Sales	Sales Representative	2	2	1

This analysis reveals how long employees typically stay in their roles and departments before being promoted. Differences across departments and roles might highlight areas where career development opportunities are more or less frequent.

The longest time of service is for Manager and Director roles across all departments. This is logical as these are the highest job levels that one employee can achieve in this company, and with an appropriate amount of salary they tend to serve for a long period.

For other job roles, the relatively high length of service and long time since last promotion are for Healthcare Representative and Sales Executive. I can bring up some reasons behind this:

- In both healthcare and sales, building strong relationships with customers can be crucial to success. This can lead to a sense of loyalty and commitment to the organization, even if there are opportunities for advancement elsewhere.
- These roles often require specialized skills or knowledge that can be difficult to acquire or replace. This can make them more valuable to the organization and increase their job security.

However, it also indicates a lack of career growth opportunities or a feeling of stagnation among employees for these two roles.

4.4.2. Time to Promotion Analysis by Gender and Job Role

```
select Gender,
       JobRole,
       AVG(YearsSinceLastPromotion) AS AvgYearsToPromotion
from Attrition
group by Gender, JobRole
order by Gender, JobRole;
```

Gender	JobRole	AvgYearsToPromotion
Female	Healthcare Representative	3
Female	Human Resources	1
Female	Laboratory Technician	1
Female	Manager	3
Female	Manufacturing Director	2
Female	Research Director	3
Female	Research Scientist	1
Female	Sales Executive	2
Female	Sales Representative	1
Male	Healthcare Representative	2
Male	Human Resources	1
Male	Laboratory Technician	1
Male	Manager	5
Male	Manufacturing Director	1
Male	Research Director	3
Male	Research Scientist	1
Male	Sales Executive	2
Male	Sales Representative	1

This result provides an overview of how the average time to promotion varies by gender and job role, potentially revealing gender-based discrepancies in career advancement.

The most significant difference is observed in the Manager role, where male employees take an average of 5 years to be promoted compared to 3 years for female employees. This suggests potential disparities in career advancement for women in managerial positions.

Other than that, there is no notable gender difference in promotion times.

4.4.3. Identify different employee segments based on development needs and career aspirations.

```
with DevelopmentNeeds as (
    select
        EmployeeNumber,
        JobRole,
        Department,
        JobSatisfaction,
        TrainingTimesLastYear,
        case
            when JobSatisfaction < 2 AND TrainingTimesLastYear > 4 then 'High Need'
            when JobSatisfaction = 3 AND TrainingTimesLastYear = 4 then 'Medium Need'
            else 'Low Need'
        end as DevelopmentNeed
    from Attrition
)
select
    JobRole,
    Department,
    DevelopmentNeed,
    count(*) as EmployeeCount
from DevelopmentNeeds
group by JobRole, Department, DevelopmentNeed
order by JobRole, Department, DevelopmentNeed
```

JobRole	Department	DevelopmentNeed	EmployeeCount
Healthcare Representative	Research & Development	High Need	5
Healthcare Representative	Research & Development	Low Need	122
Healthcare Representative	Research & Development	Medium Need	4
Human Resources	Human Resources	Low Need	52
Laboratory Technician	Research & Development	High Need	8
Laboratory Technician	Research & Development	Low Need	244
Laboratory Technician	Research & Development	Medium Need	7
Manager	Human Resources	High Need	1
Manager	Human Resources	Low Need	10
Manager	Research & Development	High Need	2
Manager	Research & Development	Low Need	52
Manager	Sales	High Need	1
Manager	Sales	Low Need	36
Manufacturing Director	Research & Development	High Need	3
Manufacturing Director	Research & Development	Low Need	140
Manufacturing Director	Research & Development	Medium Need	2
Research Director	Research & Development	High Need	1
Research Director	Research & Development	Low Need	79
Research Scientist	Research & Development	High Need	4
Research Scientist	Research & Development	Low Need	277
Research Scientist	Research & Development	Medium Need	11
Sales Executive	Sales	High Need	9
Sales Executive	Sales	Low Need	311
Sales Executive	Sales	Medium Need	6
Sales Representative	Sales	High Need	2
Sales Representative	Sales	Low Need	80
Sales Representative	Sales	Medium Need	1

This segmentation analysis classifies employees into different development need categories, helping HR tailor development programs to specific employee needs.

I analyzed the development needs for each employee based on the job satisfaction and the last time they had training. Specifically, the category of high need for development contains employees with JobSatisfaction < 2 and TrainingTimesLastYear > 4; the category of medium need contains employees with JobSatisfaction = 3 and TrainingTimesLastYear = 4; else are filtered into the low need category.

At a glance I can tell that mostly every department distributes a larger number of employees with low need for career development. The highest number of employees needed for development are Sales Executive at the Sales department.

5. Conclusions and Recommendations

With everything that was covered, here are my notable conclusions and future recommendations:

- **Younger employees (18-25)** exhibit higher attrition rates, likely due to factors associated with early career transitions and the unique characteristics of Gen Z. Organizations can implement enhanced onboarding and mentorship, career development planning, and flexible work arrangements to provide a supportive environment, assist with career planning.
- Reason for attrition is **not related** to gender inequality.
- **Sales executives** may feel restricted in their career growth within a single organization, leading to a higher propensity to seek external opportunities. The suitable solutions is to create clear career paths and development opportunities within the Sales department to provide employees with a sense of growth and progression.
- Employees at **job level 3** may face higher levels of stress or more demanding tasks, leading to increased attrition. Moreover, new employees at **job level 1** may experience difficulties adjusting to the organization, contributing to higher turnover. Hence, for job level 3, we need to provide additional support and resources to help employees cope with the challenges and demands of their roles. For job level 1, we can set clear expectations and goals for new employees to provide a sense of direction and purpose.
- The issues of long commutes and low job satisfaction are **not the primary reasons** driving employee attrition.
- There are **no notable pay inequities** within other job roles except for the significant discrepancies for Manager and Director (which is understandable).
- The employee with the lowest income in return for his outstanding working results, has almost **one-sixth** of the average income. Such **contradition** means HR department should conduct a thorough review of the performance

evaluation process or review the compensation structure to ensure that it adequately rewards high performance

- There seems to be a **lack of career growth opportunities** or a feeling of stagnation among employees for **Healthcare Representative** and **Sales Executive** roles. Still, HR department needs to develop clear career paths and progression frameworks for these roles to provide employees with a sense of direction and motivation. Moreover, invest in training and development programs to equip employees with the skills and knowledge needed to advance their careers.
- There is a potential disparities in career advancement for **women in managerial positions**. First of all, HR department needs to review performance evaluation criteria to ensure they are objective and free from gender bias. If there exist bias, it is vital to create a workplace culture that values diversity and inclusion, promoting respect, fairness, and equal opportunities for all employees.
- The highest number of employees **needed for development** are **Sales Executive** at the Sales department. Clearly there is a need to offer specialized training programs on advanced sales techniques, negotiation skills, and customer relationship management to enhance their sales performance.

This is the end of the report. Thank you for your commitment!