HR-METRICS

A report submitted for the course of

Application Development_Data Analytics Explore

III B. Tech II Semester

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2022-23

CERTIFICATE

This is to certify that this bonafide record of the Application Development entitled **HR-METRICS** submitted by **SK.ANSAR ALI (2011CS030148), T.TARUN KUMAR(2011CS030152),V.SRIMAN(2011CS030164) ,K.THANSHITH(2011CS030177)** of III year II semester to the Malla Reddy University, Hyderabad. This bonafide record of work carried out by us under the guidance of our supervision. The contents of this report, in full or in parts, have not been submitted to any other Organization for the award of any Degree.

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DECLARATION

We certify that

- The work contained in this report is original and has been done by us under the guidance of our supervisor.
- The work has not been submitted to any other Organization for any degree.
- We have followed the guidelines provided by the Organization in preparing the report.
- We have conformed to the norms and guidelines given in the Ethical Code of Conduct of the Organization.
- Whenever we have used materials (data, theoretical analysis, figures, and text) from other sources, we have given due credit to them by citing them in the text of the report and givingtheir details in the references.

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ACKNOWLEDGEMENT

We would like take this opportunity to acknowledge everyone who has helped us in every stage of this project.

We ineffably indebted to **Ms. B.Prashanthi, Assistant Professor , CSE (Data Science)** for conscientious guidance and encouragement to accomplish this Application.

We extremely thankful to **Ms. M. Shailaja**, **Assistant Professor, App Development Convener, Dept. of CSE (DS), Malla Reddy University** for his continuous support.

We wish to convey our sincere thanks to **Dr. G.S Naveen Kumar**, **Head of Department, Dept. of CSE(DS), Malla Reddy University** for his continuous support.

We wish to convey our gratitude **to Prof. Dr. K. Harikrishna, Associate Dean-SoE, Malla Reddy University** for his continuous support.

We wish to convey our extended gratitude **to Prof. K Kailasa Rao, Dean-SoE, Malla Reddy University** for his continuous support.

We would like to express our special gratitude and thanks to **Dr. VSK Reddy, Vice Chancellor, Malla Reddy University** for his continuous support.

We are also grateful to all administrative staff and the technical staff of Computer Science and Engineering (Data Science) Department, people who provided us the useful and necessary information needed for this project.

ABSTRACT

A subject of vast knowledge in which predictive and descriptive analytics is of its main components which includes employee one turnover analysis, employee work performance analysis and training requirements analysis as results. The main purpose of Human Resource management is to measure the achievement of employees and their role in the work services or business which acts as benefits to the company and to analyze employee period in the company. The main motto of Human Resource analytics is to identify skilled individuals strive extremely for of who the return investment for the organization by considering several factors which a better understanding of the for help predictive analysis. Employee is individual churn by considered a major problem for many organizations. It is one of the crucial problems to identify because it affects sustainability and also the organization‟ s planning and enhancing work culture harmony. Therefore, the Human Resource department in every organization is striving hard paying attention identify underlying and the to improvements. By identifying this demand, the study aims to increase the ability to identify employee churn using POWER BI with the help of real-time data insights in dashboards for HR management.HR report is an analytical method used to display human resources -related status , insights , and metrics with the primary purpose of improving workforce performance , recruiting procedures and other relevant HR processes with the help of HR dashboards.

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LIST OF ABBREVIATIONS

HR	Human Resources
BI	Business intelligence
RF	Random Forest
SL	Sick Leave
WFH	Work From Home
HWFH	Half Work From Home
PL	Paid Leave
HP	Half Day Paid Leave
BL	Birthday Leave
LWP	Leave Without Pay
WO	Weakly off
HO	Holiday off
ML	Menstrual Leave
DAX	Data Analysis Expression
ROI	Return On Investment

CHAPTER 1: INTRODUCTION

HR report is an analytical method used to display human resources-related stats, insights, and metrics with the primary purpose of improving workforce performance, recruiting procedures and other relevant HR processes with the help of HR dashboards Human Resource (HR) analytics is an integrated approach to improvise the decision making capability to achieve organizational goals. High-end predictive modelling is used in HR analytics where the organization faces the scenarios to forecast the consequences of the organization or enterprise policies [4]. Most of the organizations lack a widespread look towards the workforce and require human resources predictive, analysis to perform workforce development and is necessary for the organization to develop various aspects of the company such as IT and financial skills for better ROI(Return On Investment). Predictive analytics is much of forecasting the organization's goals based on the workforce rather than a descriptive analysis ..

Employees are the most important asset within an organization. This HR dashboard project shows an HR leader training program metrics such as completion percentage, hours and cost. It takes the employee's data set and based on this dataset it predicts the attrition rate and due for promotion using Random Forest Algorithm. HR executives strive to maintain a diverse and balanced workforce, so they need to fully understand the demographic characteristics of their employees. HR dashboard analysis allows them to deeply analyse data on age, gender, location, department and ethnic groups. Using an interactive dashboard, HR professionals can dig deeper into demographic data and analyse one variable, such as ethnic diversity.

1.1 Introduction:

An HR analytics is a business intelligence tool that allows Human Resource teams to track, analyse and report on HR KPIs. Modern, interactive dashboards leverage an HR analytics platform which makes it easy to combine data from all systems and to deeply explore this data directly within the dashboard. This way, HR teams can quickly find insights that will improve recruiting, optimize workplace management and enhance employee performance. Employee performance dashboards help HR teams and business managers understand the effectiveness, satisfaction and goal progress of their workforce. To analyse compensation vs. performance this project shows the number of active employees by rating

level and salary by employee rating. Employees are the most important asset within an organization. This HR dashboard project shows an HR leader training program metrics such as completion percentage, hours and cost. It takes the employee's data set and based on this dataset it predicts the attrition rate and due for promotion using Random Forest Algorithm. HR executives strive to maintain a diverse and balanced workforce, so they need to fully understand the demographic characteristics of their employees. HR dashboard analysis allows them to deeply analyse data on age, gender, location, department and ethnic groups. Using an interactive dashboard, HR professionals can dig deeper into demographic data and analyse one variable, such as ethnic diversity. Managing and analysing such vast amounts of HR data manually is time consuming and prone to mistakes. This is where Machine Learning comes in

1.2 Background

In today's data-driven business environment, organizations are increasingly recognizing the value of HR data analysis to make informed decisions and drive strategic planning. HR data analysis provides insights into employee performance, recruitment trends, retention rates, and overall organizational effectiveness. Power BI, a powerful business intelligence tool, offers capabilities for analyzing and visualizing HR data. This project aims to explore the use of Power BI for HR data analysis and reporting.

1.3 Objectives

The objectives of this project are as follows:
Analyze HR data to identify patterns, trends, and correlations.
Develop a comprehensive HR data dashboard using Power BI.
Visualize HR metrics and key performance indicators (KPIs) through interactive charts and visualizations.
Derive actionable insights to enhance HR decision-making and processes.

BI Tool	Service Provider
Power BI	Microsoft
Tableau	Tableau Software
Qlik Sence	Qlik
QlikView	Qlik
Microstrategy	Microstrategy Corporation
MSBI	Microsoft

fig 1.1: *List of power BI tools*

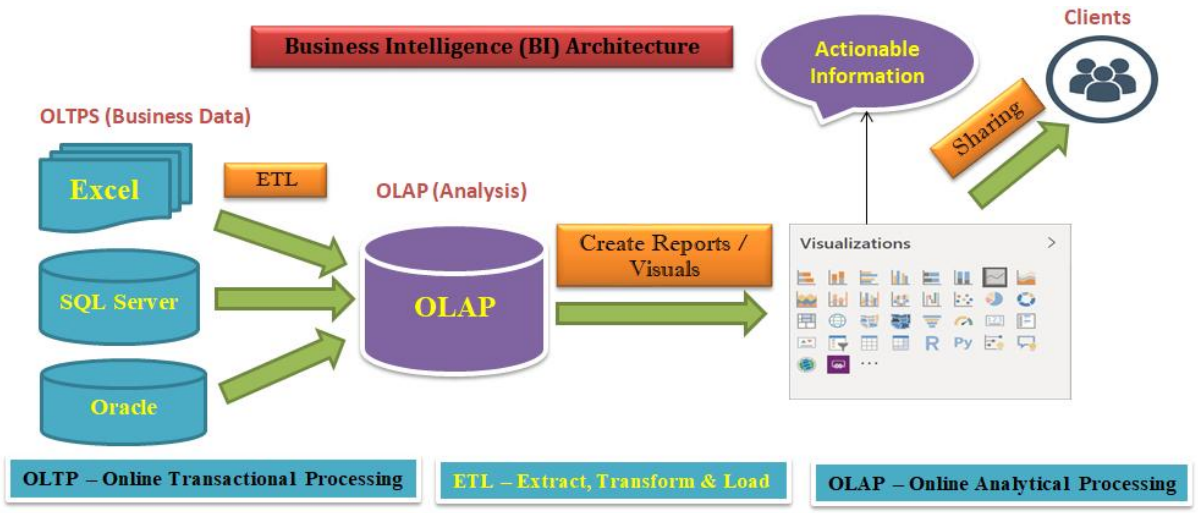

fig 1.2: BI architecture

1.2 Software and Hardware requirements:

HARDWARE REQUIREMNETS	SOFTWARE REQUIREMENTS
• Ram: 2GB Ram and above	• Power BI (business intelligence)
• Hard Disk: 5GB and above	• The Operating System can be Windows 10
• Processor: x86 64-bit CPU (Intel / AMD architecture) and above	

***Table 1.1:** Hardware and Software requirements*

1.3 Example:

Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Your data might be an Excel spreadsheet, or a collection of cloud-based and on-premises hybrid data warehouses. Power BI lets you easily connect to your data sources, visualize, and discover what is important, and share that with anyone or everyone you want.

Microsoft power BI (business intelligence) helps organizations in analyzing data and share insights. Using power bi service, small and big enterprises can monitor their business

operations closely and receive quick answers via rich dashboards. This technology keeps updating itself every month with amazing features and functions. As per Markets and Markets report, the global BI market size to grow from USD 23.1 billion in 2020 to USD 33.3 billion by the year 2025 @CAGR of 7.6% according to the forecast period.

Major companies currently using Power BI include Walmart, Apple, Exxon Mobile Corporation, McKesson Corporation, Berkshire Hathaway for the purpose of Data Analysis.

Let us take an example of a class consisting 90 students attending various subject classes every day. Consider, that the attendance is being taken for every subject. Knowing the regularity of a student every day and for a particular subject is difficult. It is also complex if the attendance is in excel sheet. So, with **'HR-METRICS'** we can get to know the regularity of every student with ease. We can also generate the reports subject-wise. The reports are displayed on the dashboard with the help of the Power BI tool. Therefore, the reports of attendance subject-wise, day-wise, and month-wise can be represented through the different data visualization types(e.g.: bar graphs, pie charts, etc.)

CHAPTER 2: REVIEW OF RELEVANT LITERATURE

A distinguishing feature of strategic human resource management research is an emphasis on human resource (HR) systems, rather than individual HR practices as a driver of individual and organizational performance. Yet, there remains a lack of agreement regarding what these systems are, which practices comprise these systems, how these systems operate, and how they should be studied. Our goal in this paper is to take a step toward identifying and addressing several conceptual and methodological issues regarding HR systems. Conceptually, we argue that HR systems should be targeted toward some strategic objective and operate by influencing (1) employee knowledge, skills, and abilities, (2) employee motivation and effort, and (3) opportunities for employees to contribute. Methodologically we explore issues related to the relationships among policies and practices, sampling issue, identifying the appropriate referent group (s), and who should serve as key informants for HR system studies.

2.1 HR Analytics and Data Analysis

This section provides an overview of HR analytics and its significance in organizational decision-making. It explores the benefits and challenges of HR data analysis and highlights the various statistical and analytical techniques employed in HR analytics.'
such as its ability to handle large datasets, create dynamic dashboards, and generate real-time reports. It showcases case studies where Power BI has been successfully used for HR data analysis, including workforce planning, diversity tracking, and employee performance management.

2.2 Power BI in HR Analytics

This section discusses the role of Power BI in HR analytics and reporting. It showcases the features and functionalities of Power BI that make it suitable for HR data analysis. Relevant literature and case studies demonstrating the successful application of Power BI in HR analytics are reviewed.
Visualizations display insights that have been discovered in the data. A Power BI report might have a single page with one visual or it might have pages full of visuals. In the Power BI service, visuals can be pinned from reports to dashboards. Used visualizations: Bar chart and column chart, Tales, Slicers, Cards, Filter. The Strategy is to display maximum details insights that would help HR manager to determine the best and worst performing employees and their distribution across the departments. Also to find which department needs more manpower so that the works follows smoothly despite retrenching the existing employees. Making use of different KPI's to get detail insights that would not to able find using tradition data watching.

CHAPTER 3: METHODOLOGY

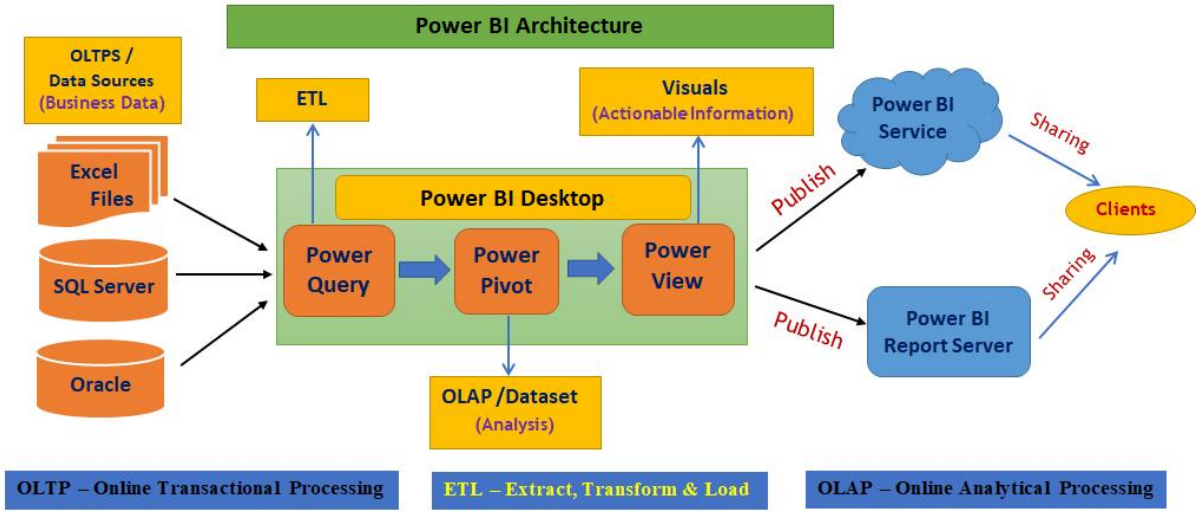

***Fig3.1** : Power BI architecture*

POWER BI DESKTOP :

Power BI Desktop is a tool to Connect to, clean, model, and visualize your data. Power BI Desktop is the combination of below software's :

- Power Query
- Power Pivot
- Power View

POWER QUERY :

Power Query is used for data extraction, transformation, and loading. It is an ETL Software in Power BI. With the help of power query, we will connect to the different data sources to extract the data, transform the data and then we will load the data into power pivot. The Power Query Software comes with a graphical tool "Power Query Editor" and a formula language M (Mashup) language to transform the data and to create the custom functions. Power query can load the result set into power pivot model.

POWER PIVOT:

Power pivot is an in-memory columnar database where we store the data that is required for analysis purpose. power pivot is used for preparing an OLAP / dataset. Power Pivot is the place where we place the transformed data that is loaded by power query for data modeling. Power pivot works on xVelocity In-Memory based tabular engine. To enhance the data model power pivot uses Data Analysis eXpression language (DAX) for building new columns, new measures/quick measures & new tables.

POWER VIEW :

Power view is used for data visualization. With power view you can create interactive charts, graphs, maps, and other visuals that bring your data to life.

POWER BI SERVICE:

Power BI Service(Power BI Online) is a cloud application which available as SAAS (Software as a Service). It is a Business Intelligence Service designed to help users visualize and analyze data in a centralized environment. If we save anything to the Power BI Service then everything will get save into the cloud.

POWER BI REPORT SERVER:

If you wants to setup Power BI Service on our local premises then we can use Power BI Report Server. It is a licensed Web Application which requires Premium License. It is the solution for the clients who want to save the complete information within the organization. Power BI Report Server is maintained and managed by the Power BI Admin

POWER BI MOBILE:

Microsoft offers End/Client Users to view and interact with Power BI Service reports and dashboards at any time directly from their Mobiles using Power BI Mobile.

POWER BI DESKTOP:

Power BI Desktop is a free stand-alone application from Microsoft which is used to connect, transform, analyze millions of rows of data, creating data models, visualizations and finally sharing them with others by publishing them into Power BI service /Power BI Report Server. Power BI Desktop is the Integration of:

1. Power Query (an ETL Tool) used to perform Data Transformations

2. Power Pivot (In-Memory Data-Modelling Component)

Used to Perform Data Modelling

+

3. Power View (Visualization Tool) used to create Visualizations.

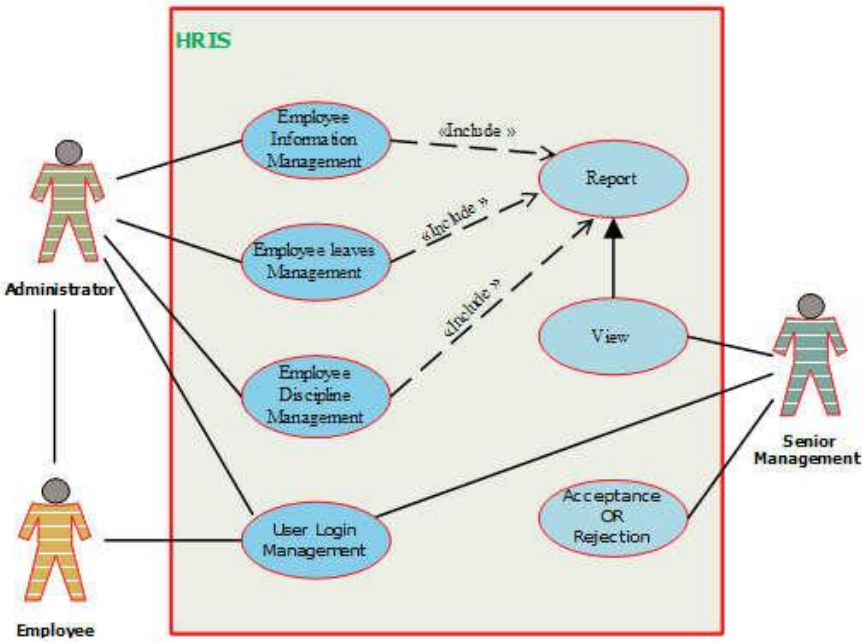

FIGURE 3.2 : *Use case diagram*

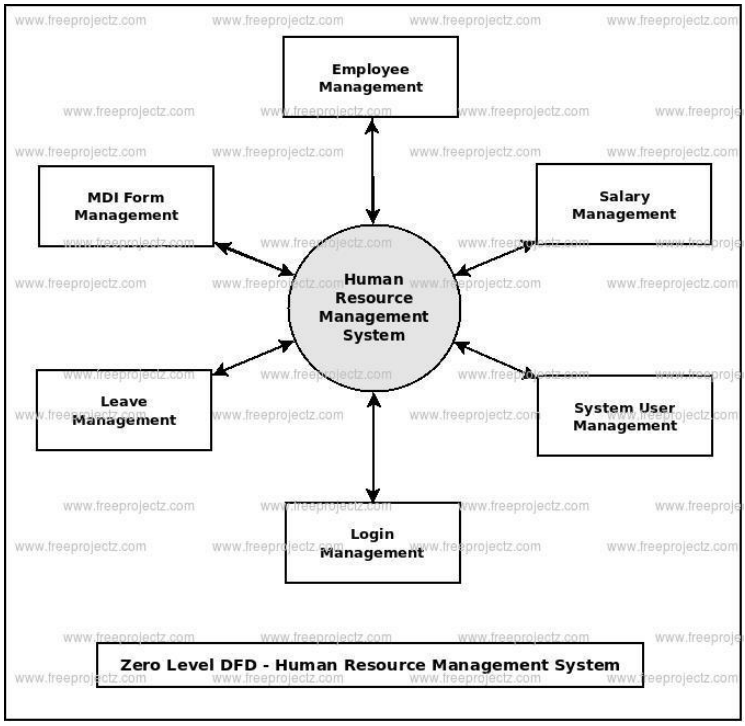

FIGURE 3.3 : Data flow diagram

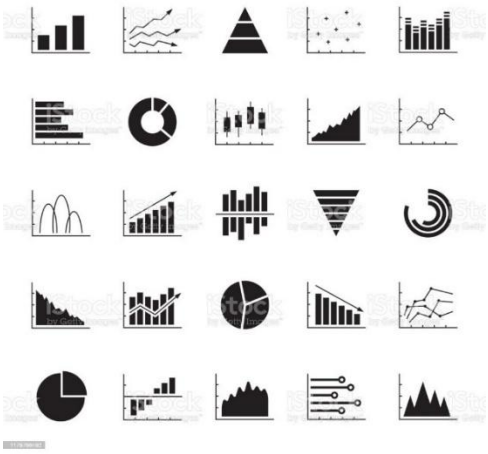

Fig 3.4 *: Different types of data visualizations*

The various Power BI visualizations used by us in developing this project are

- SLICER
- TEXT BOX
- TABLES
- LINE CHART
- AREA CHART

SLICER:

A slicer is a standalone chart that can be used to filter the other visuals on the page. Slicers come in many different formats (category, range, date, etc.) and can be formatted to allow selection of only one, many, or all the available values.

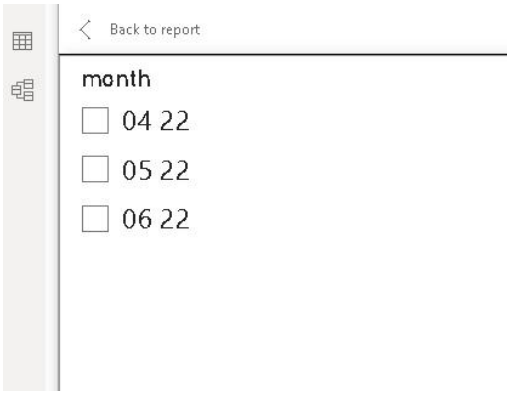

FIG3.5 : *Slicer for the monthly data view*

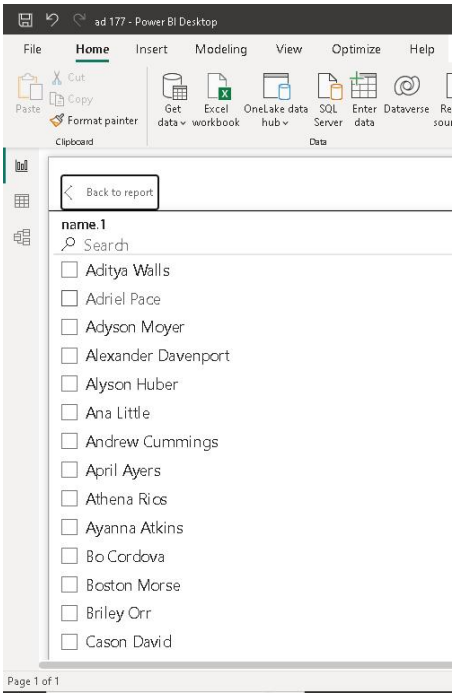

fig 3.6 : *Slicer for viewing for individual names*

Single number cards display a single fact, i.e., a single data point. Sometimes a single number is the most important thing you want to track in your Power BI dashboard or report, such as total sales, market share year over year, total opportunities etc.

Text box:

In Power BI, you can use a text box to display text or add descriptive information to your reports and dashboards. A text box allows you to add static text, dynamic expressions, or a combination of both. Here's how you can use a text box in Power BI

fig 3.7 : *Text box of dashboard*

TABLES:

Tables are a fundamental visual component in Power BI that can be highly useful for HR data analysis. You can use tables to present and analyze HR data in a structured and tabular format. Here's how you can leverage tables in Power BI for HR data analysis:
By utilizing tables in Power BI for HR data analysis, you can efficiently analyze and present key HR metrics, compare employee information, identify trends, and gain valuable insights into your HR operations.

A table is a grid that contains related data in a logical series of rows and columns. It may also contain headers and a row for totals. Tables work well with quantitative comparisons where you are looking at many values for a single category. For example, this table displays five different measures for Category.

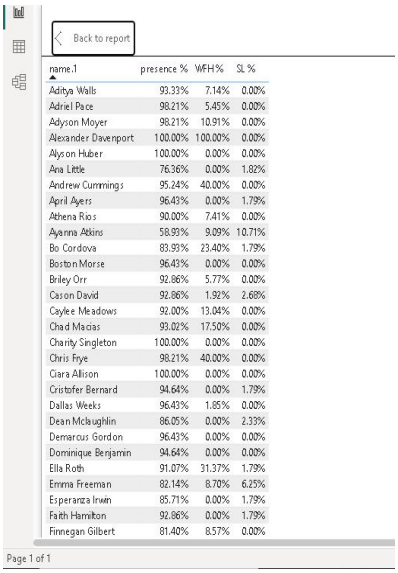

Fig 3.8 : *Scatter Chart*

LINE CHART:

Line charts are a powerful visualization option in Power BI for analyzing trends and patterns in HR data. You can use line charts to visualize metrics such as employee performance,

training progress, headcount over time, or any other HR-related time-series data. Here's how you can create a line chart in Power BI for HR data analysis:

Using line charts in Power BI for HR data analysis enables you to visually track and understand trends, patterns, and changes over time. This can help you identify correlations, seasonality, performance trends, and make informed HR-related decisions.

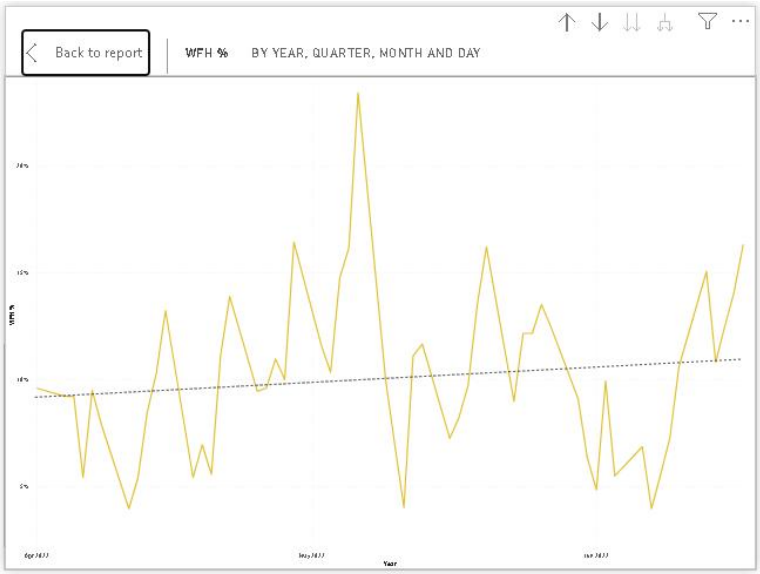

fig 3.9 : *line chart*

AREA CHART :

In Power BI, an area chart is a type of visualization that displays data as a series of data points connected by a line, with the area between the line and the x-axis filled in. It is particularly useful for HR data analysis as it can effectively show trends, patterns, and changes over time.

For HR data analysis, an area chart can be used to visualize various metrics

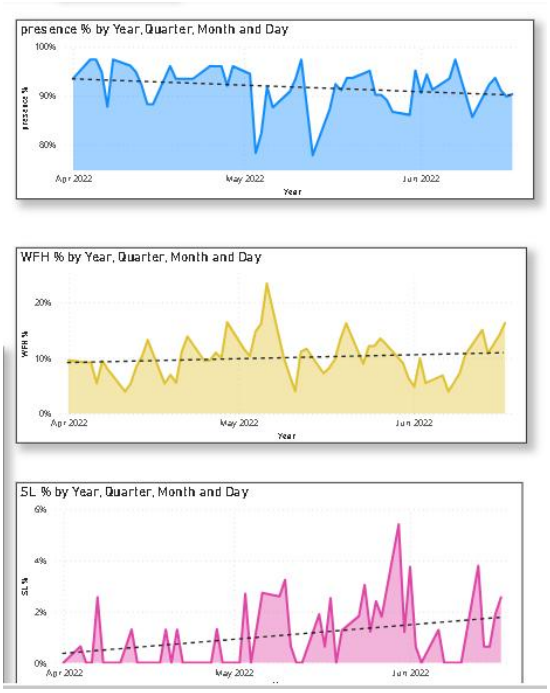

Fig 3 .10: *Area chart of the employees working preferences*

CHAPTER 4: RESULTS AND DISCUSSION

FIGURE 4.1 : HR Analytics flow diagram

1 Data Analysis Findings The data analysis conducted using Power BI on the HR data yielded several key findings and insights. These findings provide valuable information about various HR metrics and their implications for the organization. The following are some examples of the data analysis findings:

4.1.1 Work-from-Home Arrangements:

The analysis revealed that the percentage of employees working from home has increased steadily over the analyzed period.
The highest work-from-home rates were observed during peak periods of project deadlines or external factors such as a global pandemic.
Certain departments or job roles showed higher adoption rates of work-from-home arrangements, indicating the potential for department-specific policies or guideline

4.12. Sick Leave Patterns:

The analysis identified a seasonal pattern in sick leave, with higher rates during flu seasons or colder months.

Certain teams or departments showed higher sick leave rates, suggesting potential areas for targeted interventions to address health and well-being concerns.

The analysis revealed a correlation between sick leave and specific job roles, indicating the need for tailored strategies to support the health of employees in those roles.

4.1.3 Employee Productivity:

The analysis showed a positive correlation between work-from-home arrangements and employee productivity.

Employees with a higher frequency of work-from-home exhibited increased productivity levels, potentially due to reduced commuting time and a more flexible work environment.

The analysis also identified productivity variations among different teams or departments, highlighting areas for further investigation and potential performance improvement initiatives.

4.2.1 Implications for HR Policies:

The findings suggest that promoting and supporting work-from-home arrangements can have a positive impact on employee productivity. This indicates the need for developing comprehensive remote work policies and providing necessary resources to facilitate successful remote work.

The analysis of sick leave patterns can help HR departments identify potential health issues or work-related factors that contribute to higher sick leave rates. This information can be used to develop targeted wellness programs and implement preventive measures.

4.2.2 Employee Well-being:

The insights gained from the analysis of sick leave patterns can guide HR initiatives aimed at promoting employee well-being and creating a healthy work environment.

By identifying departments or job roles with higher sick leave rates, organizations can implement strategies to reduce stress, improve work-life balance, and address specific challenges faced by those employees.

4.2.3 Performance Optimization:

The analysis of employee productivity provides an opportunity for HR departments to identify top-performing teams or departments and learn from their practices to improve overall organizational performance.

By understanding the factors that contribute to higher productivity, such as work-from-home arrangements, organizations can optimize work arrangements and foster a culture of high performance.

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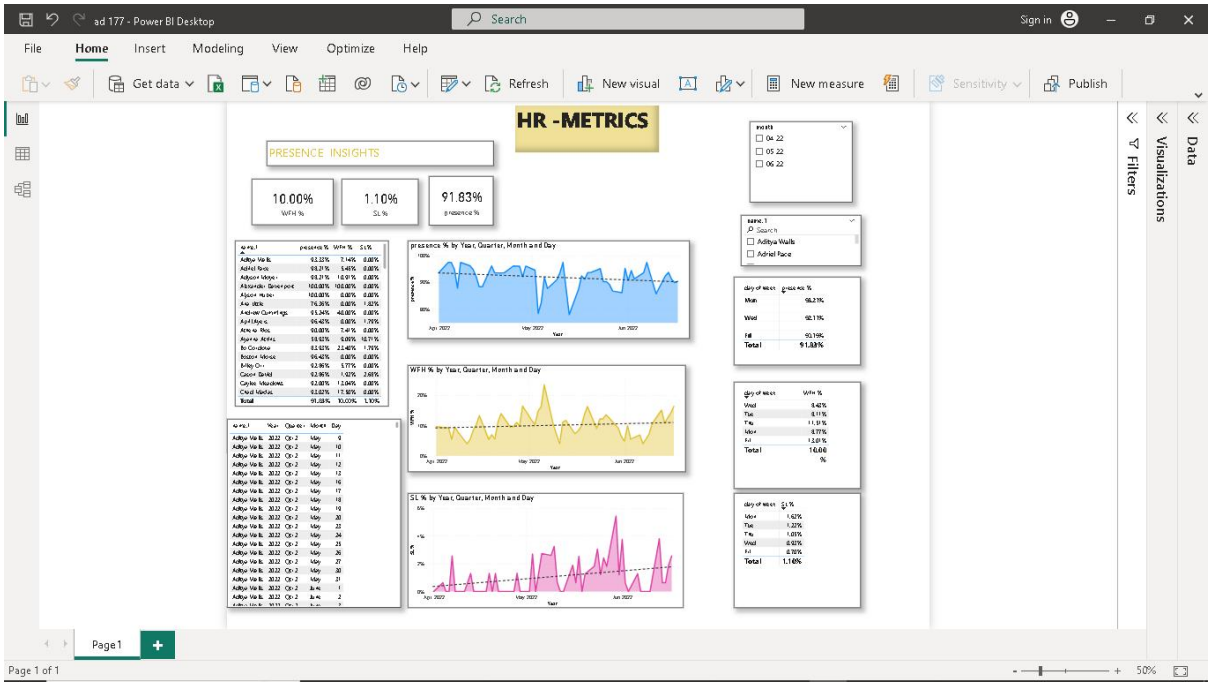

FIGURE 4.2 : report of the project

This is the Main Page which show the reports of Bar Chart, Card, Scatter, Table, Pie chart, and Slicer Visualization.

- In the report the first table the work from home (WFH%) of the Employees .
- The next chart shows the Sick leave (SL)% according to the persons who took sick leave.
- In the third chart, it describes about the employees who are present in the company on a particular date and month
- In the report we have a slicer which partition the data into discrete months so that it makes us to easy to access the data
- Table consists of the number of employees data with respect to their percentage of working preferences.
- Next we have three area charts in the dash board which describes about the working preference of the employees and it also shows us the trend line in each graph respectively.
- In the report we have three tables towards the right side and the table 1 describes about the data of a company on a particular day about the presence percentage of the employees.

- The second table describes about the percentage of the employees who are willing to work from home on any particular day.
- The third table describes about the percentage of the employees who took sick leave on a particular day
- Card shows the average of attendance%.
- The slicer consists of all the roll numbers, if we select any of the roll number the following data will be displayed.

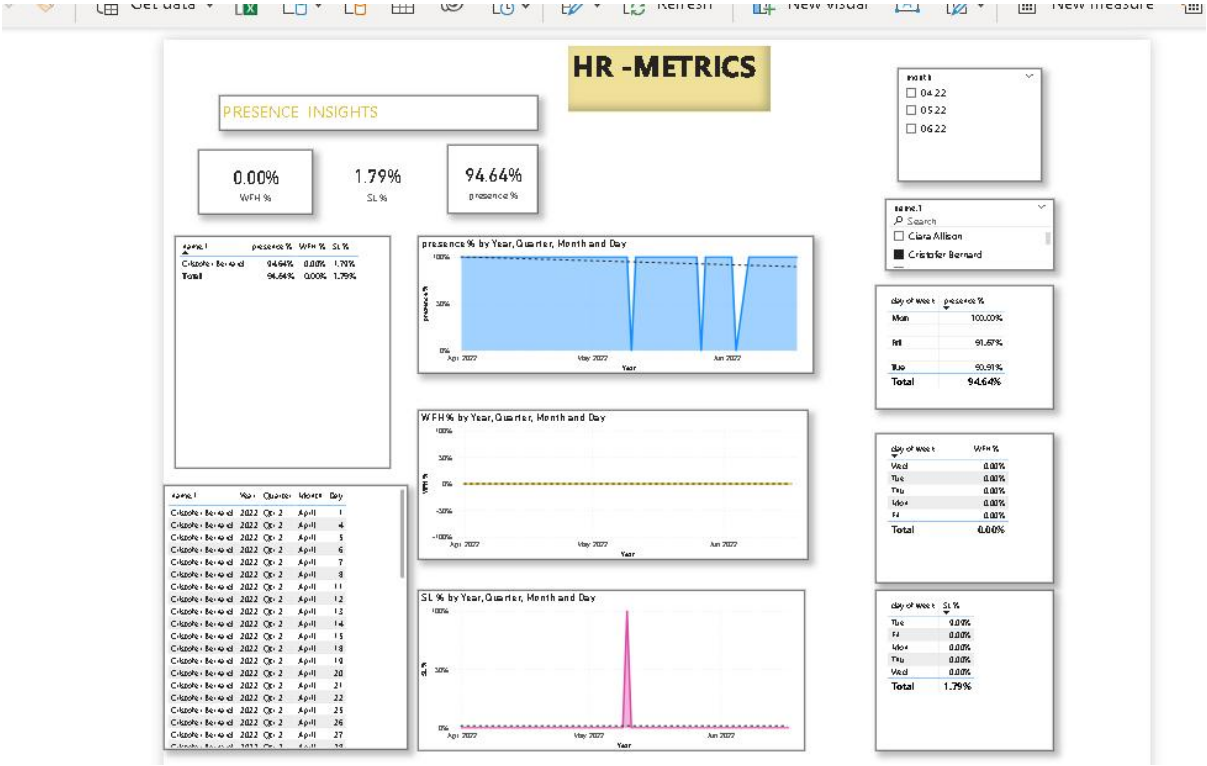

FIGURE 4.3 : Report of the individual person

Here only the selected name of the employee data in the dashboard name: Cristofer Bernard .

CHAPTER 5: CONCLUSION AND FUTURE SCOPE

CONCLUSION:

In conclusion, the application of Power BI in HR data analysis has proven to be a valuable tool for organizations. Through the utilization of Power BI's features and capabilities, organizations have been able to gain actionable insights into their HR data, leading to data-driven decision-making and improved HR management practices.

The analysis of HR data using Power BI has provided valuable insights into various aspects of workforce management, including work-from-home arrangements, sick leave patterns, employee productivity, and well-being. These insights have enabled organizations to identify trends, correlations, and potential areas for improvement.

By visualizing HR data through Power BI's interactive dashboards and reports, organizations have enhanced their ability to track key HR metrics, monitor workforce dynamics, and identify opportunities for optimization. The ability to create dynamic and customizable visualizations has facilitated effective communication of HR insights across different levels of the organization.

FUTURE SCOPE:

The future scope for HR data analysis in Power BI is promising, as the field of HR analytics continues to evolve and organizations recognize the importance of data-driven decision-making in managing their workforce. Here are some potential areas of growth and development:

1. Advanced analytics: Power BI is likely to incorporate more advanced analytical capabilities to provide deeper insights into HR data. This may include predictive analytics, machine learning algorithms, and natural language processing to uncover patterns, trends, and correlations in HR data.

2. Employee engagement and retention: Power BI can play a crucial role in measuring and improving employee engagement and retention. Future developments may include the integration of sentiment analysis and social media data to gauge employee satisfaction, as well as the creation of interactive dashboards that allow HR professionals to identify potential attrition risks and take proactive measures.

3. Workforce planning and optimization: Power BI can aid in strategic workforce planning by analyzing historical and current data to forecast future talent needs, identify skills gaps, and optimize workforce allocation. Advanced capabilities may include scenario modeling and workforce simulation to support long-term planning and decision-making.

4. Diversity and inclusion analytics: Organizations are increasingly focused on promoting diversity and inclusion in the workplace. Power BI can be leveraged to analyze diversity metrics, such as gender, ethnicity, and age, and track progress towards diversity goals. Future developments may include benchmarking against industry standards and the integration of external data sources to provide a comprehensive view of diversity and inclusion efforts.

5. HR metrics and reporting: Power BI can streamline HR reporting by providing interactive dashboards and automated report generation. Future enhancements may include standardized HR metric libraries, customizable templates for specific HR domains (e.g., recruitment, performance management), and integration with HR management systems to automate data extraction and consolidation.

6. Self-service analytics: Power BI empowers HR professionals to perform ad-hoc analysis and generate insights without heavy reliance on IT or data analysts. In the future, the tool is likely to become even more user-friendly, allowing HR professionals with limited technical skills to leverage its capabilities and gain valuable insights from HR data.

7. Data privacy and security: As data privacy regulations become stricter, future developments in Power BI may include enhanced data governance features to ensure compliance with regulations like GDPR (General Data Protection Regulation) and CCPA (California Consumer Privacy Act). This could involve features such as data anonymization, access controls, and audit trails.

Overall, the future of HR data analysis in Power BI is expected to be characterized by advancements in analytics, increased automation, and greater integration with other HR systems and external data sources. These developments will enable HR professionals to make data-driven decisions, optimize workforce management, and contribute to organizational success.

improving employee engagement and retention. Future developments may include the integration of sentiment analysis and social media data to gauge employee satisfaction, as well as the creation of interactive dashboards that allow HR professionals to identify potential attrition risks and take proactive measures.

In this fast-evolving world, it's more important than ever to have a plan to address the looming skills gap.

While HR analytics will help identify trends in current learning and training patterns, in the long run, a thoughtful coaching strategy is necessary to give your teams the skills they need to thrive.

But, you can also address this skills gap right now:

By making the most of the talent already in your organization: highlighting and activating those in your organization who have the right skills for the right opportunities, right now.

By identifying the trends of your most highly effective professionals. For example, what do your top engineers have in common? Or what skills do your most successful salespeople share? In short, finding tomorrow's leaders… today

REFERENCES:

Here are some references that can provide you with more information on HR data analysis:

1. "HR Analytics Handbook" by Laurie Bassi and Daniel McMurrer: This comprehensive handbook explores various aspects of HR analytics, including data collection, analysis techniques, and the impact of analytics on HR decision-making.

2. "People Analytics: HR Transformation Through Data" by Ben Waber: This book delves into the world of people analytics and highlights how HR professionals can use data to gain insights into employee behavior, engagement, and productivity.

3. "The Power of People: Learn How Successful Organizations Use Workforce Analytics To Improve Business Performance" by Nigel Guenole, Jonathan Ferrar, and Sheri Feinzig: This book provides practical guidance on using workforce analytics to drive business performance and improve HR decision-making.

4. "HR Analytics: The What, Why, and How" by Moshin Ghouri: This book offers a comprehensive introduction to HR analytics, covering the fundamentals, key metrics, tools, and techniques for effective analysis.

5. "Predictive HR Analytics: Mastering the HR Metric" by Martin R. Edwards and Kirsten Edwards: This book focuses on predictive analytics in HR, discussing how to use data to forecast workforce trends, identify potential risks, and optimize HR strategies.

6. "HR Analytics: The Definitive Guide to Using Data to Drive Your HR Strategy" by Bernard Marr: This guide provides an overview of HR analytics, explaining its benefits, implementation process, and case studies of successful HR analytics initiatives.

7. "Data-Driven HR: How to Use Analytics and Metrics to Drive Performance" by Bernard Marr: This book explores how HR professionals can leverage data and analytics to drive performance and make informed decisions across various HR functions.

8. "Human Resource Analytics: Measuring Returns on Investments" by Jac Fitz-enz: This book focuses on the financial impact of HR analytics, demonstrating how to measure and evaluate the ROI of HR initiatives using data and analytics.

9. chat gpt for the dax queries in the power bi for modeling the data.

These references can serve as valuable resources to deepen your understanding of HR data analysis and provide practical insights for implementing analytics in your HR practices.